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86th Congress
1st Session

COMMITTEE PRINT

THE STATUS OF WORLD HEALTH

In Outline Text and Chart

PREPARED FOR THE

COMMITTEE ON GOVERNMENT OPERATIONS

UNITED STATES SENATE

AND ITS

SUBCOMMITTEE ON REORGANIZATION AND INTERNATIONAL ORGANIZATIONS

(PURSUANT TO S. RES. 42, 86TH CONGRESS)

MARCH 10, 1959

Printed for the use of the Senate Committee on Government Operations

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LETTER OF TRANSMITTAL

U.S. SENATE,
March 10, 1959.

Hon. JOHN L. MCCLELLAN,
Chairman, Senate Committee on Government Operations,
Senate Office Building, Washington, D.C.

MY DEAR MR. CHAIRMAN: There is attached for your consideration the committee print entitled "The Status of World Health—in Outline Text and Chart."

This is the third in the series of publications by this subcommittee, acting under Senate Resolution 347, 85th Congress. This resolution had authorized a full and complete study of any and all matters relating to international health, research, rehabilitation and assistance programs. The resolution was supplemented by S. Res. 42, 86th Congress, continuing the study until January 31, 1960.

The first committee print of this series was, as you know, entitled "International Medical Research," the second, "Statutory Medical and Health-Related Research in the United States Government—The Basis for International Cooperation."

Additional publications are, in process. These committee prints are intended basically for purposes of background to our comprehensive analysis of Federal research and assistance activities.

With kindest wishes, I am,

Sincerely yours,

HUBERT H. HUMPHREY,
Chairman, Subcommittee on Reorganization and International Organizations.

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FOREWORD

By Hon. Hubert H. Humphrey, Chairman, Subcommittee on Reorganization and International Organizations

"What would a brief, overall view of world health problems show?"

This question is answered in part in the pages which follow.

The answer—in chart and text—is designed to offer insight on a subject of interest to all mankind.

This presentation was prepared by the U.S. Public Health Service at the request of the subcommittee.

The compilation is, by intention, relatively brief. It is aimed solely for initial background purposes of the subcommittee, of other interested legislators, and the public. It fills a particular need in the early phases of the world health study, as authorized by the 85th and 86th Congresses.

NEED FOR "THE BIG PICTURE"

However, the publication will, it is believed, make rapidly possible for the reader a larger, more inclusive, type picture than piecemeal views of world health, such as may have been seen in times past.

This "big picture" is our goal. Only with the "big picture" in mind can the Congress, it is believed, effectively evaluate existing and proposed world health programs.

BROAD RESPONSIBILITY OF THIS COMMITTEE

Under the Rules of the Senate, the Committee on Government Operations bears the continuing responsibility of rendering an accounting of existing programs. In order to do so, full perspective as to these programs is essential.

Such perspective requires a total, not a segmented view.

This is especially important because the U.S. responsibilities under world health programs continue to mount. Hardly a year has elapsed since World War II in which these programs have not been elaborated by the legislative and executive branches in response to felt need.

U.S. POLICY STATEMENT IN 1958

The committee notes that the Mutual Security Act of 1958, Public Law 85–477, enacted June 30, 1948, provided a policy declaration as follows:

> (m) The Act of June 14, 1948, as amended (22 U.S.C. 290) authorizing participation in the World Health Organization, is amended by adding the following new section 6:
>
> "SEC. 6. The Congress of the United States, recognizing that the diseases of mankind, because of their widespread prevalence, debilitating effects, and heavy toll in human life, constitute a major deterrent to the efforts of many peoples to

develop their economic resources and productive capacities, and to improve their living conditions, declares it to be the policy of the United States to continue and strengthen mutual efforts among the nations for research against diseases such as heart disease and cancer. In furtherance of this policy, the Congress invites the World Health Organization to initiate studies looking toward the strengthening of research and related programs against these and other diseases common to mankind or unique to individual regions of the globe."

The wide dimensions of this policy declaration may now perhaps be better seen by means of the charts in this committee print.

LIMITATIONS IMPOSED BY UNAVAILABILITY OF DATA

Yet the publication itself does not contain all that the Public Health Service and this subcommittee would have desired if various necessary facts had been actually available. Regrettably, an analysis of the world health situation is difficult due to the lack of accurate, current statistical data, particularly from the less developed countries. The attached material represents a collection of such data as are available and are documented.

Primary information is presented on population distribution and growth which is basic to a study of world health problems. Special attention has been given to "indicators of health," selected disease problems, and health resources.

HEALTH INDICATORS

In June 1953 a U.N. Committee of Experts met to discuss an international definition and measurement of standards and levels of living. This Committee agreed that it was impossible to establish any single index to measure standards and levels of living but singled out some 12 components, including a wide variety of social and economic factors. The first on the list of these components was health, including demographic conditions. This item was referred to the World Health Organization for further refinement by experts who emphasized several items of value for such measurements. These "health indicators for measurement of levels of living" include life expectancy, infant mortality, and crude annual death rates. Narrative and graphic material have been prepared on these indices to illustrate the general levels of health in the world.

LIFE EXPECTANCY DATA

Life expectancy data reflect, to a considerable extent, the general health conditions that make possible a longer life for the average individual and sometimes offer a means of making a broad comparison of levels of health in different countries. However, in many underdeveloped areas, life expectancy figures are wholly lacking; and even in some of the other countries, calculations are made at only 10-year or longer intervals and do not always reflect current progress. More comprehensive data on life expectancy at various ages instead of just at birth would give this indicator much greater usefulness. But except for a few countries, these figures do not exist.

INFANT MORTALITY

The infant mortality charts present the proportion of deaths occurring within the first year of life. Since it is during this period that poor health conditions take their greatest toll, the data are of high significance. These statistics must, however, be taken with some reservations, since in many countries registration of births and infant deaths are far from complete or accurate, and the official rate will often prove unreliable.

It may be pointed out that, if available, figures on infant mortality for ages 2 to 12 months would be much more sensitive to actual social, economic, and general health conditions than the first year rate, and that, therefore, deaths within the first month should ideally be placed in a separate category. But there is no immediate likelihood that these figures can be obtained.

ANNUAL DEATH RATE

The crude annual death rate is of somewhat less importance than the two preceding indicators, since it is influenced greatly by the sex-age structure of the population. For purposes of international comparison, its use is limited to those countries where sex-age structure is roughly the same. Here again, in some underdeveloped countries, these figures are not wholly accurate or complete. However, in those countries where life expectancy and infant mortality figures are nonexistent they constitute the indicator most commonly used for demographic information.

DIARRHEAL DISEASES

In this report an attempt has been made to present the data by graphs, charts, maps, and tables, with a minimum of narrative comment, on the most widespread diseases with the exception of diarrheal diseases and upper respiratory infections. Both of these disease entities are universal in prevalence. Morbidity and mortality from these diseases are probably greatest in those areas which are least able to give accurate statistics.

The meager data which do exist show that diarrheal diseases are the first cause of death in a number of countries and affect particularly children under 5 years of age. Even where mortality is relatively low, the diseases are important causes of illness not only in children, but in adults as well; and hence it is a source of economic loss.

Factors considered pertinent to the control of diarrheal diseases include the provision of a safe, adequate water supply and sanitary facilities for excreta disposal; the prevention of fecal pollution of ground and surface water supplies and of its spread by insect and animal vectors; the provision of adequate housing and the freedom of housing from rodents, insects, and domestic animals; and the sanitary control of the production, processing, and storage of milk and food for family and public consumption.

Programs to correct existing conditions which are conducive to the spread of diarrheal diseases require vast capital outlays and the persuasion of people in many areas to think in terms of sanitation and family hygiene, concepts previously unknown to them.

HEALTH RESOURCES

With respect to health resources, the report deals with health personnel only. It is the reservoir of trained personnel which defines to a large extent the limits of the services possible. Unfortunately, it was not possible to obtain reliable data on the number of health centers and dispensaries in existence. Latest information on hospitals published in 1954, using data extending back to 1949, was considered outdated in view of the increasing interest over the past decade of national and international health agencies in increasing the quantity and quality of hospital services.

A CONCLUSION—MORE STATISTICS NEEDED

This publication attempts to offer no conclusion but the one which is most apparent, based on the gaps, which have been mentioned earlier. The conclusion is that more information must become available if the health of the world's people is to be improved through strengthening both preventive and curative medicine. The widespread lack of adequate, accurate, up-to-date vital and health statistics, especially in the developing areas of the globe, is serious. These regions, and all authorities are aware that this insufficiency of data represents one of the most severe shortcomings in world health today. This is of course not a new problem; it has its roots in broad socioeconomic needs throughout entire societies. Yet reliable statistics are indispensable now for three main purposes—strengthened research, organization, and planning.

Efficient use of medical money, materiel and manpower requires therefore the early improvement of statistical reporting services. This point has been wisely and repeatedly stressed by authorities of the World Health Organization in their impressive work of assistance. The will is present. The way toward better statistics must be perfected.

Only then will it be possible for all of the elements in the "big picture" of world health to be both accurate and complete. At that time, the many major gaps in the present partial picture will have been filled in. Thus, there will have been remedied present unavoidable omissions of such significant but largely undocumented areas as the incidence of mental ill health and neurological disorders, as well as a host of other maladies, throughout the world.

SOURCES OF DATA

The primary sources from which the data herein were collected included publications and records of the United Nations, the World Health Organization, and the Pan American Sanitary Bureau, maps from the "Atlas of Diseases" by the American Geographical Society, "World Population and Production" by W. S. and E. S. Woytinsky, technical papers, various scientific journals, and the records of the Public Health Service. The reader interested in further data is referred to these original sources.

We are particularly grateful to J. B. Lippincott & Co. for permission to publish the trypanosomiasis distribution map from Global Epidemiology, volume II, by Simmons and others, to the 20th Century Fund for permission to reproduce several maps appearing in World Population and Production by W. S. and E. S. Woytinsky, to Dr. Jacque

May and the American Geographical Society for the use of data obtained from the maps in the Atlas of Disease series and to the Statistical Office of the United Nations which provided us with previously unpublished mortality data.

AGENCY AND STAFF RESPONSIBLE FOR STUDY

Lastly, the subcommittee acknowledges with thanks the continued cooperation of Secretary of Health, Education, and Welfare Arthur Flemming in this and related publications. Dr. Aims C. McGuinness, Special Assistant to the Secretary for Health and Medical Affairs has coordinated this and other responses to the subcommittee's needs in liaison with the chairman and the project director of this study.

Valuable comments and suggestions were received from the Deputy Assistant Secretary of Defense (Health and Medical), Dr. Edward H. Cushing and Dr. D. M. Alderson of his staff, and Drs. Eugene P. Campbell and Charles L. Williams, Jr., of the Public Health Division of the International Cooperation Administration.

Dr. Leroy E. Burney, Surgeon General of the U.S. Public Health Service has made available all possible assistance.

The data and charts herein were developed by the Public Health Services' Bureau of State Services. The staff for the project consisted of Dr. Frederick J. Brady, of the Office of the Bureau Chief, Mr. John C. Eason, Jr., of the Division of International Health, and Dr. Alan Donaldson, of the Communicable Disease Center, Atlanta, Ga. Special credit is due to Dr. Donaldson who spent several weeks in Washington in developing and assembling this data.

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WORLD REGIONS AS DELINEATED BY THE UNITED NATIONS

Source: 1956 UN Demographic Yearbook

PART 1. POPULATION

A. DEFINITION OF REGIONS

To meet the needs of demographic statistics, the United Nations has defined 14 regions which are constituted essentially as follows:

AFRICA

Northern Africa: Algeria, Egypt, Ethiopia, and Eritrea, Libya, Morocco, the Somalilands, Spanish possessions in north and west Africa, the Sudan, Tunisia.
Tropical and southern Africa: The remainder of Africa.

AMERICA

Northern America: Alaska, Bermuda, Canada, Greenland, and the United States.
Middle America: America south of the United States and north of Colombia, Caribbean republics and islands.
South America: Colombia and the nations to the south.

ASIA

Southwest Asia: The Arabian Peninsula (i.e., Aden, Bahrein, Gaza Strip, Kuwait, Muscat and Oman, Qatar, Saudi Arabia, Trucial Oman, Yemen), Cyprus, Iran, Iraq, Israel, Jordan, Lebanon, Syria, Turkey.
Southcentral Asia: Afghanistan, Bhutan, Ceylon, India, Nepal, Pakistan, Portuguese India.
Southeast Asia: Brunei, Burma, Cambodia, Malaya, Indonesia, Laos, north Borneo, the Philippines, Portuguese Timor, Sarawak, Singapore, Thailand, Vietnam, west New Guinea.
East Asia: The remainder of Asia, except the Asian part of the U.S.S.R., i.e., China, Hong Kong, Japan, Korea, Macau, Mongolian People's Republic, the Ryukyu Islands.

EUROPE

Northern and Western Europe: Belgium, Channel Islands, Denmark, Finland, France, Iceland, Ireland, Luxembourg, Monaco, the Netherlands, Norway, Sweden, United Kingdom.
Central Europe: Austria, Czechoslovakia, Germany, Hungary, Liechtenstein, Poland, Switzerland.
Southern Europe: The remainder of Europe, except the European parts of the U.S.S.R. and Turkey, i.e., Albania, Andorra, Bulgaria, Gibraltar, Greece, Italy, Malta, Portugal, Romania, San Marino, Spain, Yugoslavia.
U.S.S.R.: The Union of Soviet Socialist Republics including Asian Republics.

OCEANIA

Australia, New Zealand, New Guinea, Hawaii, American Samoa, Fiji Islands, Tonga, Pacific Islands.

B. WORLD POPULATION

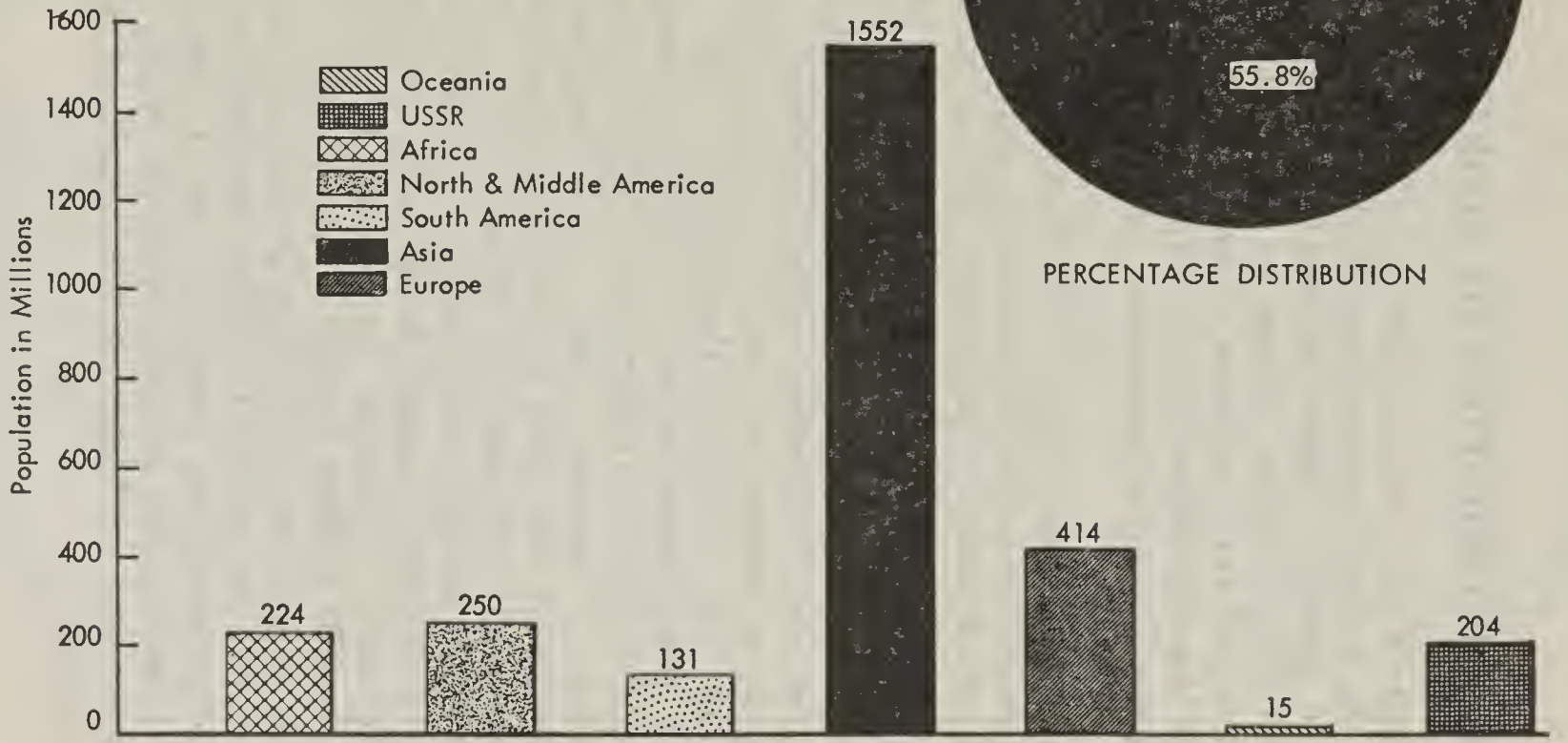
In 1957, the world population was estimated to be about 2,790 million persons.

Over one-half of this number (55.8 percent) live in Asia, 15 percent in Europe, 9 percent in North and Middle America, 8 percent in Africa, 7 percent in the U.S.S.R., 4.7 percent in South America, and the remaining 0.5 percent in Oceania.

It may be noted that only 9 countries in the world have estimated populations which exceed 50 million persons:

	Million		*Million*
China (mainland)	640	Indonesia	87
India	392	Pakistan	86
U.S.S.R.	204	Brazil	63
United States	174	West Germany	52
Japan	91	United Kingdom	52

ESTIMATED WORLD POPULATION - 1957



Source: U. N. Statistical Papers Series A, Vol. X No. 3

C. DISTRIBUTION OF WORLD POPULATION

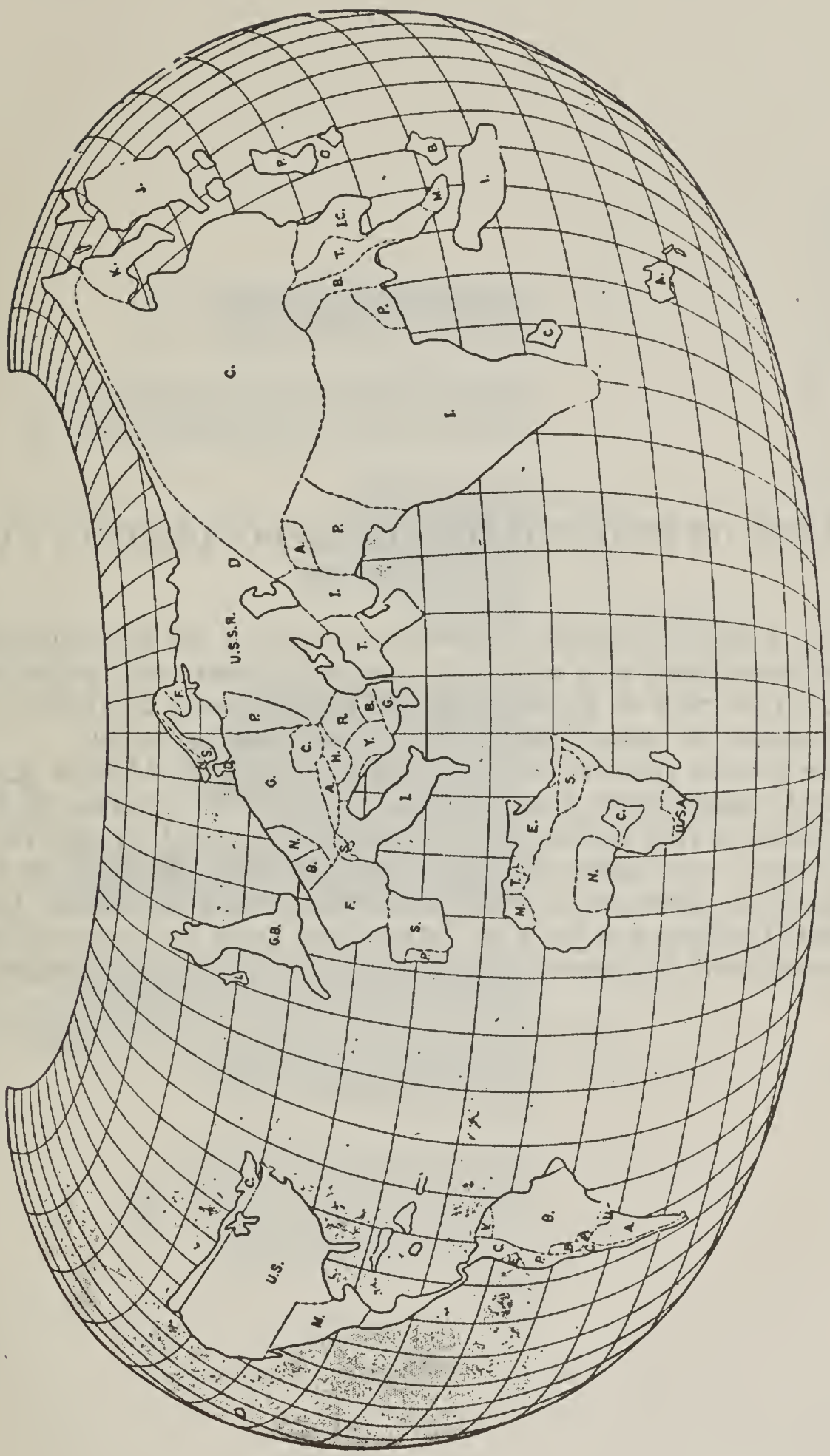
This map of the world showing continents and selected countries distorted on a scale proportionate to each 1 million of population is included to permit a more adequate appraisal of the significance of the disease distributions shown on later plates. Although this map was constructed on the basis of estimated populations for 1950, an analysis of the estimates for 1957 shows that even though populations have increased, the proportionate distribution has remained about the same.

Such a map presents an informative picture. The 8.6 million square miles of the U.S.S.R. shrinks in comparison with the 3.7 million square miles of heavily populated China mainland and the almost equally densely populated 1.2 million square miles of India. Brazil, with only one-third of the actual land area of South America, appears to occupy most of that continent, while Canada with a total land area third largest in the world (after U.S.S.R. and China mainland) becomes only a narrow strip resting on top of the United States.

According to "World Population and Production," by the Wotinskys, population density is greatest along the China mainland coast, extending north to Korea and Japan and south to the Philippine Islands and Indonesia. Here, with approximately 620 million persons living on less than 1.5 million square miles, there is an average of about 430 persons per square mile. Nearly as crowded are the 400 million people concentrated in a million square miles in the valley of the Ganges, south India, and Ceylon—an average of 410 per square mile. Europe (including European U.S.S.R.) has an aggregate of 370 million people in an area of 1.2 million square miles. The fourth largest concentration is the populous northeast section of the United States with 90 million persons in 500,000 square miles. Other concentrations of population are found along the Pacific coast of North America, the Atlantic coast of South America, in the Caribbean Islands, and in Africa at the mouth of the Niger River and in the Nile Valley.

DISTRIBUTION OF WORLD POPULATION

Continents and selected countries distorted on a scale proportionate to population in 1950



PROJECTION OF ERWIN RAISZ

Source World Population and Production - Woytinsky and Woytinsky, 1953

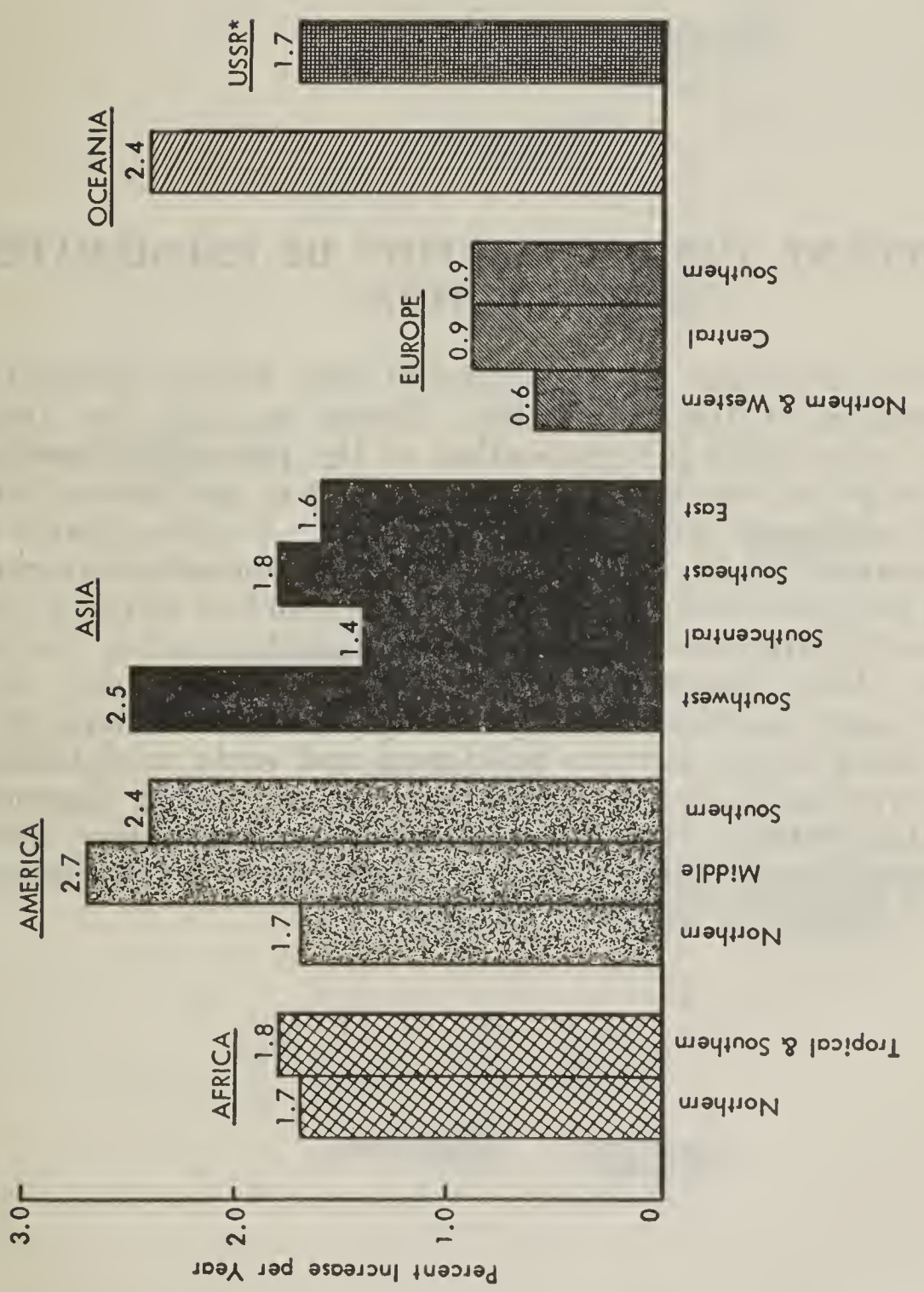
D. RATE OF GROWTH OF WORLD POPULATION BY REGION 1952–56

The world population has been growing at an accelerating rate under conditions of a relatively stable birthrate and a declining death rate. The rate of growth for the entire world is about 1.6 percent per annum, or more than 40 million persons per year.

The fastest rates of increase are occurring in Middle America (2.7 percent), southwest Asia (2.5 percent) South America (2.4 percent), and Oceania (2.4 percent). The smallest rate of change has occurred in Europe, especially Northern and Western Europe (0.6 percent).

The data presented on the accompanying chart show the average percent increase per year as determined from the mean of the annual increases and the mean population over the 4-year period 1952–56.

RATE OF GROWTH OF WORLD POPULATION BY REGION, 1952 - 1956

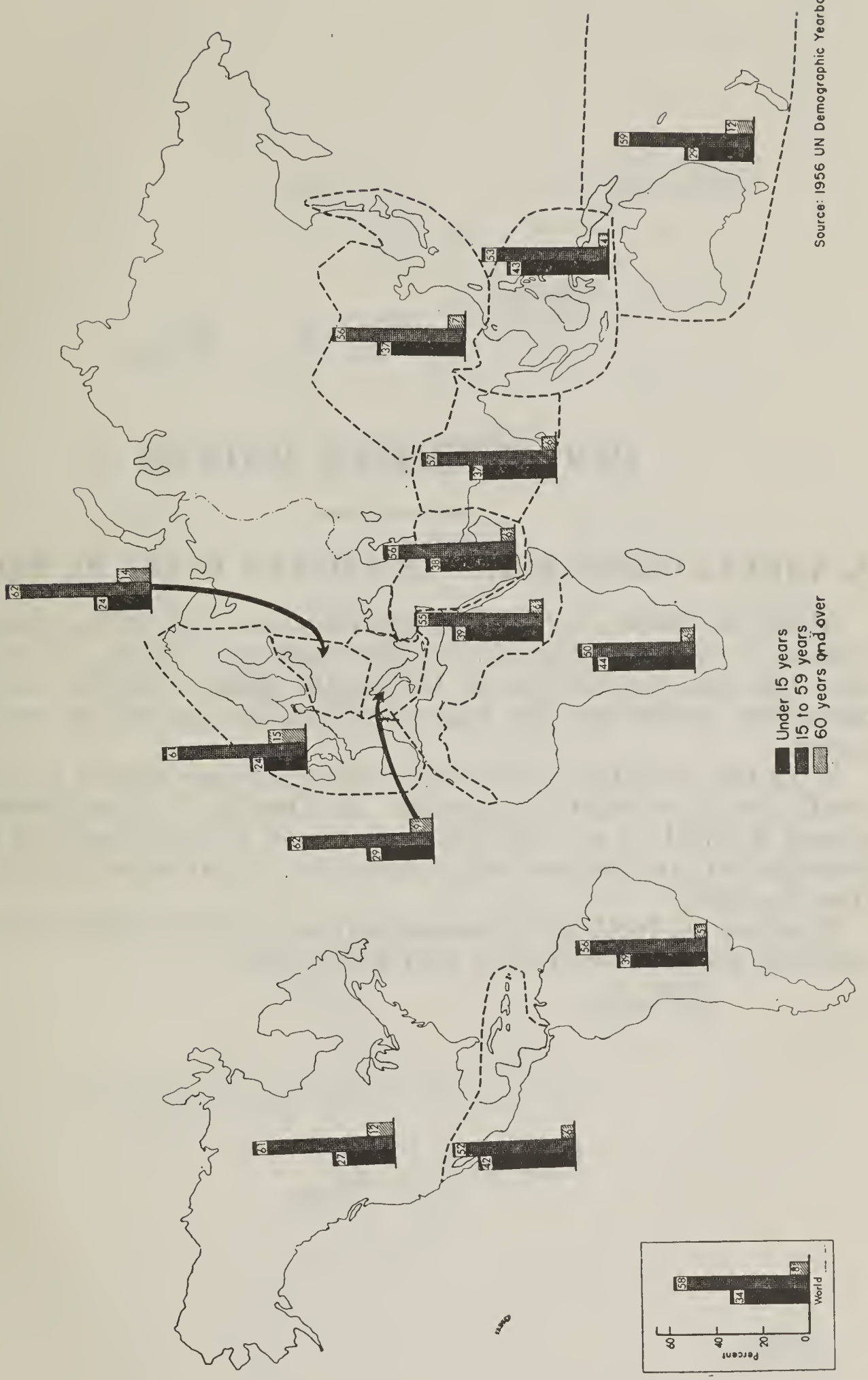


Sources: 1957 UN Demographic Year Book
UN Report on World Social Situation
*1951 - 1955

E. PERCENT AGE DISTRIBUTION OF ENUMERATED POPULATION

Birth and death rates over a period of time largely determine the age composition of the population. Based on data for the most recent year since 1950 the proportion of the population in the productive ages as well as in the older age group is greatest in the more industrially advanced countries of the West. In other parts of the world, comparatively high proportions of the population are children. In those countries which have a higher proportion of older persons, the degenerative diseases are likely to contribute most to the overall death rate. With many of the infectious diseases which formerly caused so many deaths virtually brought under control in these countries, more people survive childhood and early adulthood, later to become victims of heart disease, cancer, and other degenerative diseases. In contrast, the less-developed countries which have the highest proportion of children also are those which have the greatest incidence of infectious diseases.

PERCENT AGE DISTRIBUTION OF POPULATION BY REGIONS



PART 2. HEALTH INDICES

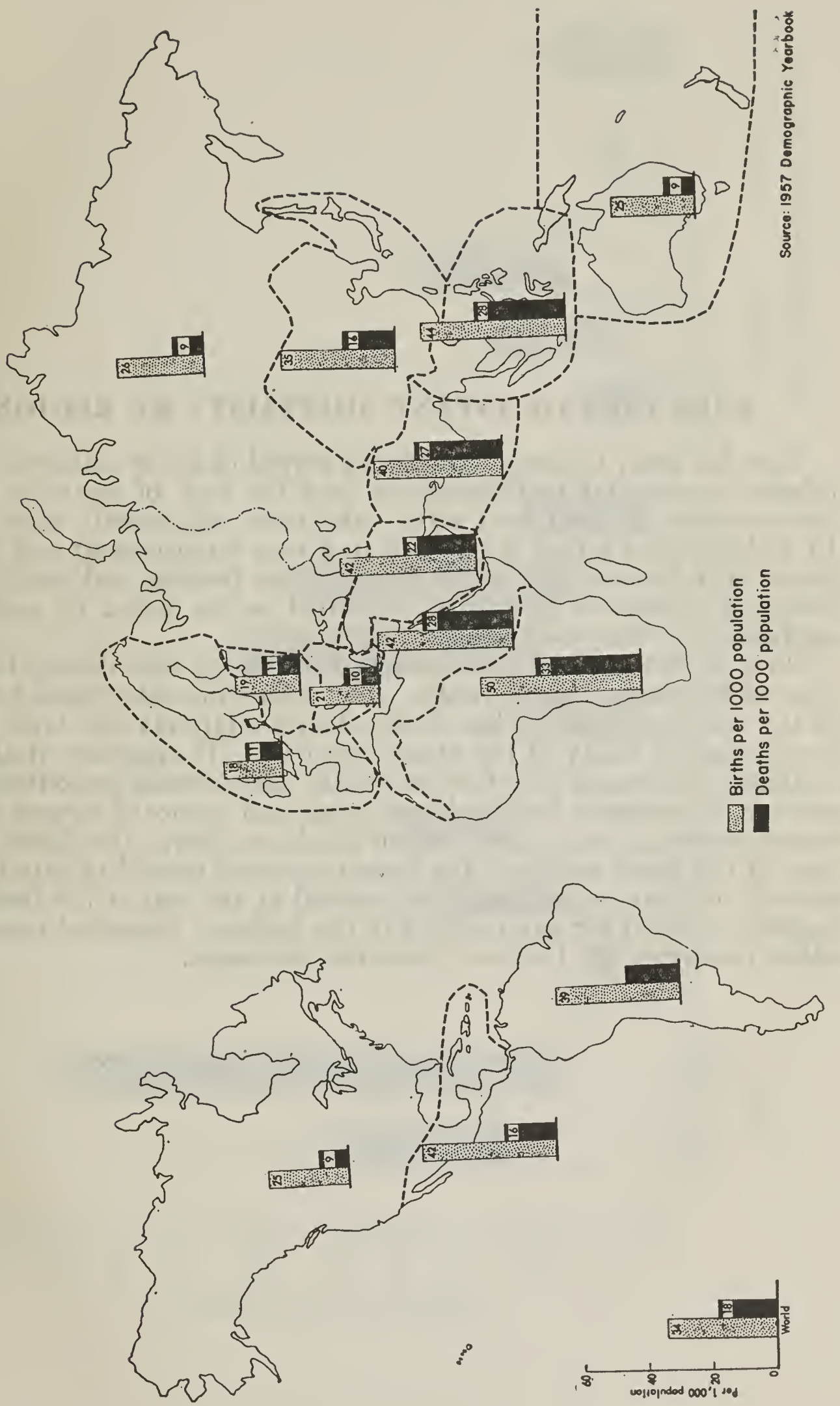
A. ANNUAL CRUDE BIRTH AND DEATH RATES BY REGIONS

About 90 million births and approximately 49 million deaths are estimated to occur annually in the world population. The difference between the births and the deaths along with the amount of migration determines the rate of population growth in any given region.

With the exception of Oceania, migration has played a relatively small part in population growths. In Oceania, it is estimated that almost a third of the population increase is accounted for by net immigration into the two major countries of that area, Australia and New Zealand.

The data set forth in the accompanying chart are those which were available for the most recent year since 1952.

BIRTH AND DEATH RATES PER 1,000 POPULATION BY REGION

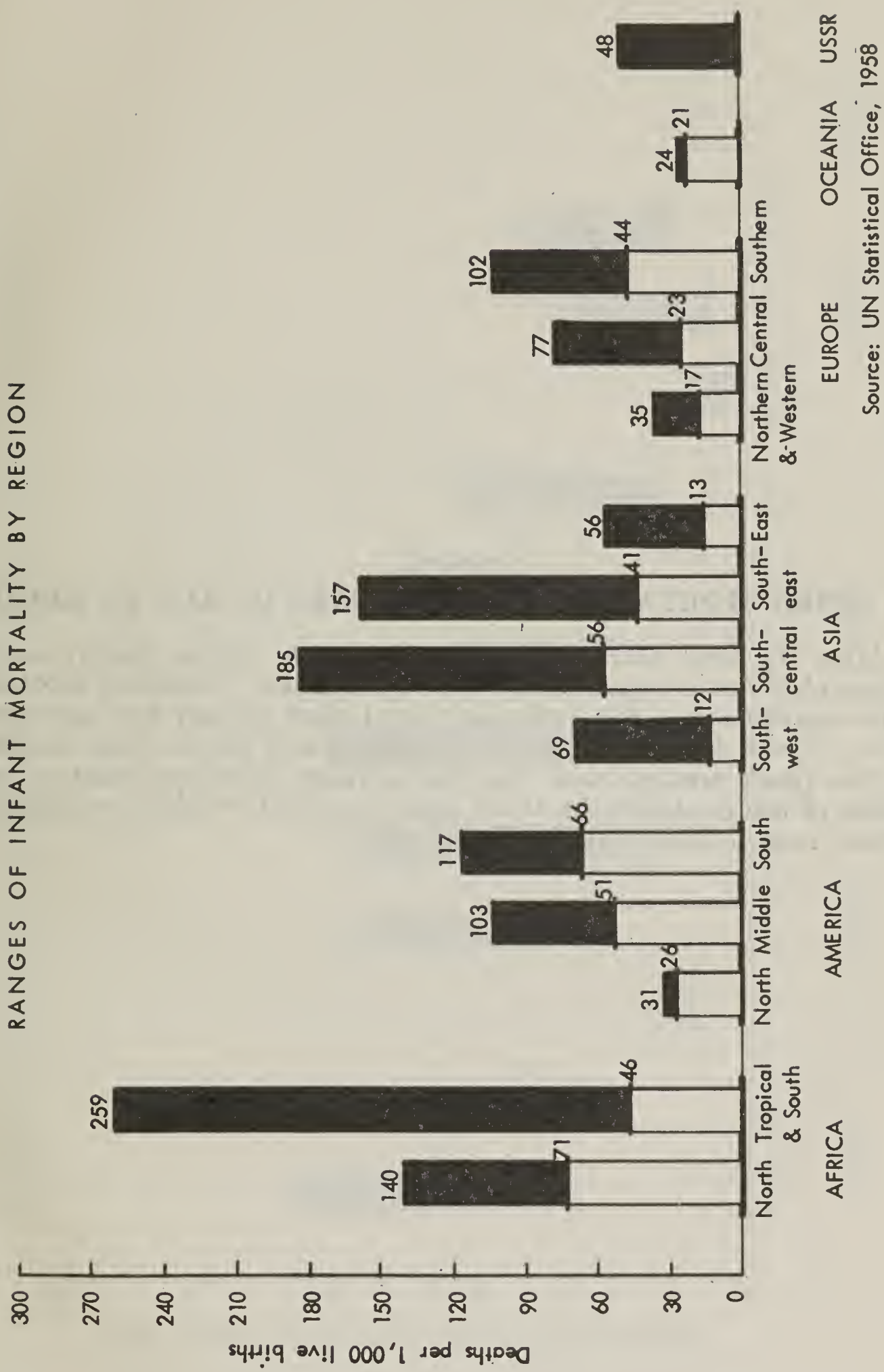


B. RANGES OF INFANT MORTALITY BY REGION

Year for year, the most hazardous period of life is infancy. Birth injuries, congenital malformations, and the lack of maturity in the development of the infant often take their toll shortly after birth. In addition, the infant is exposed to a new environment and is subjected to infections and problems of infant feeding and care. Mortality of infants is frequently regarded as an index of sanitation applicable to many countries.

On a worldwide basis, the range of the death rate during the first year of life varies considerably. The infant mortality rate for most of the western countries has declined to a relatively low level, but it is still high in many of the other countries. If complete data were available, the range of infant mortality rates would undoubtedly be greater than shown by the black areas and recorded figures on the accompanying chart. For each of the bars shown, the figure at the base of the black section is the lowest reported mortality rate for any country in that region, and the numeral at the top of the bar is the highest reported for any country in the region. Reported rates from other countries fall between these two extremes.

RANGES OF INFANT MORTALITY BY REGION

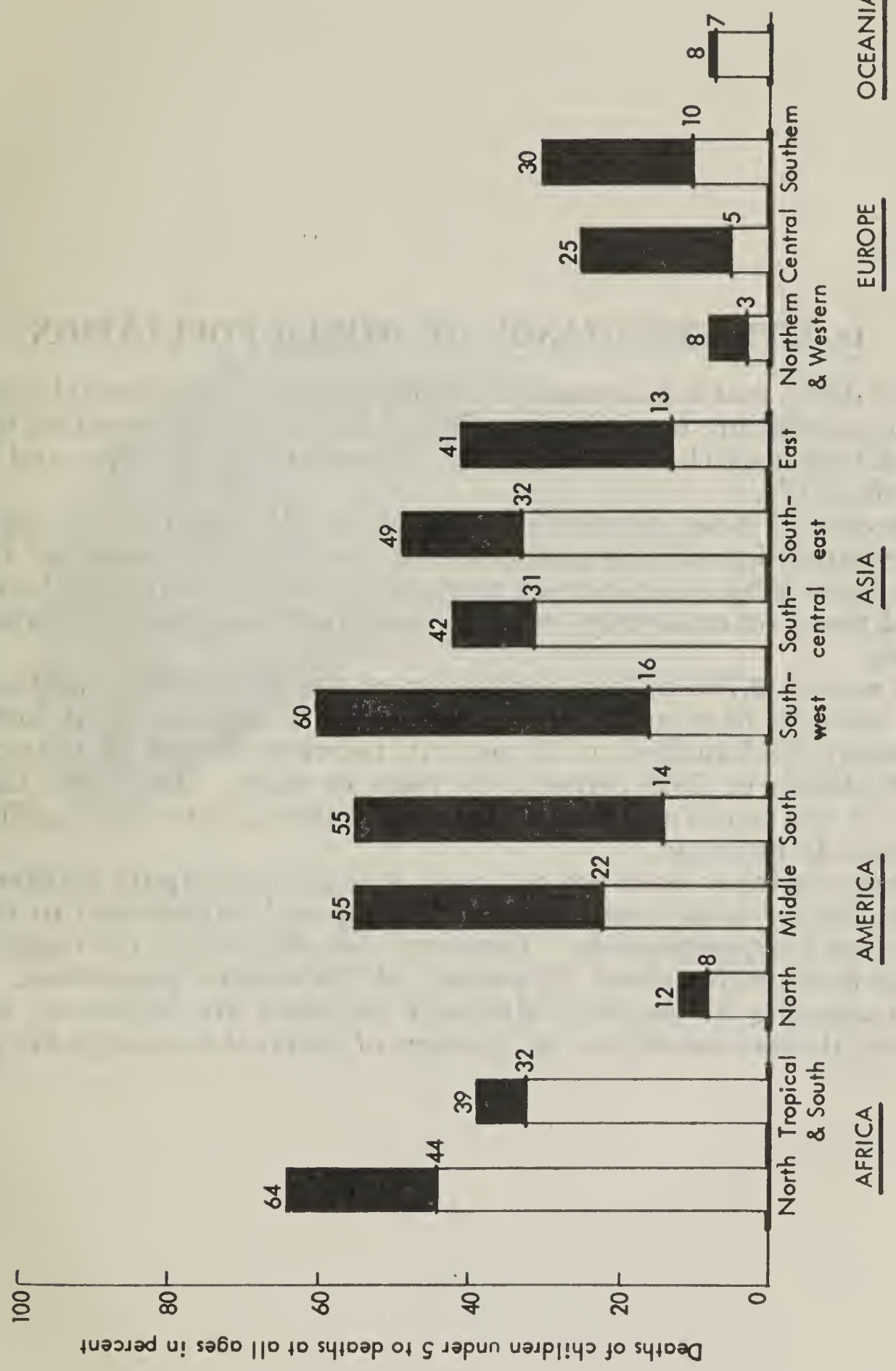


Source: UN Statistical Office, 1958

C. CHILD MORTALITY UNDER 5 YEARS OF AGE BY REGION

After the first year of life, the death rate drops sharply among young children in economically developed areas. However, mortality rates continue at a relatively high level after infancy in many countries. Thus, deaths of children from birth to 5 years of age as shown by the black area on each bar graph, range from one-third to two-thirds of the crude deaths at all ages reported in various countries in Africa, Asia, Middle and South America.

RANGES OF PROPORTIONATE MORTALITY UNDER 5 YEARS BY REGIONS



Source: UN Statistical Office, 1958

D. LIFE EXPECTANCY OF WORLD POPULATION

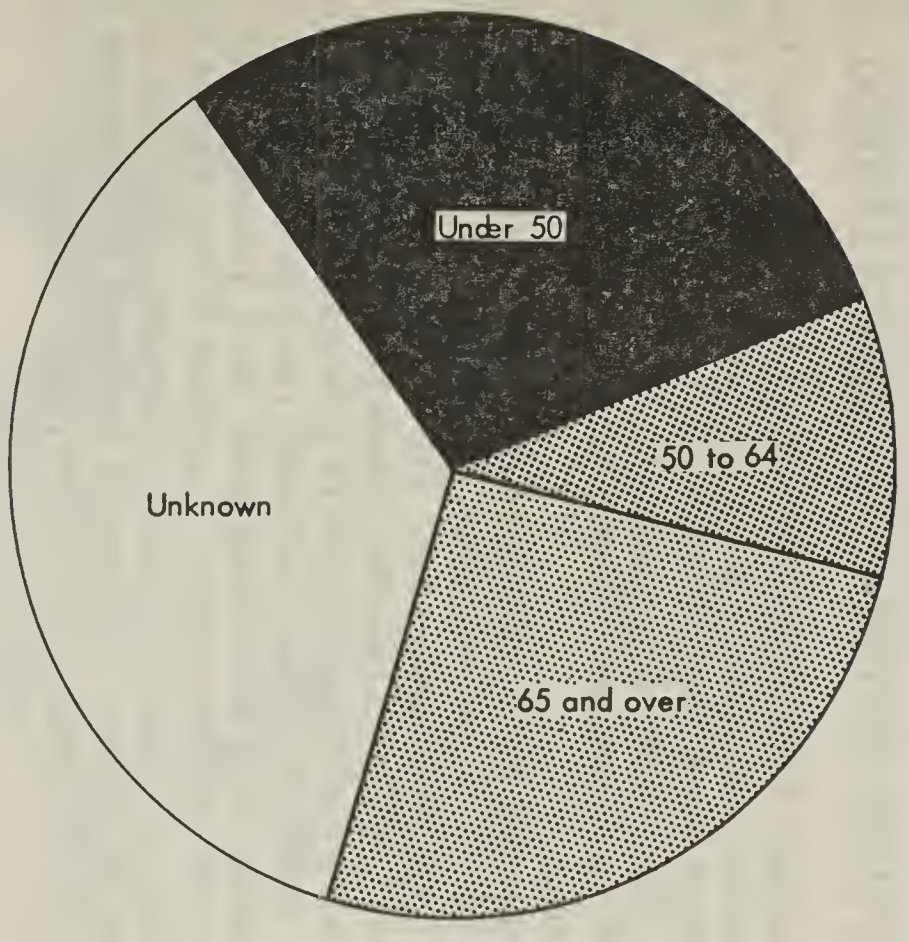
The death rate is a measure of population loss. It reflects the health of the population, but it is also affected by the age composition of the population since the risk of death is higher during the early and later periods of life.

An overall index of mortality which is adjusted for the differing age composition of the population is the life expectancy at birth. This figure is based on current mortality rates and indicates the number of years, on an average, which a baby born today may be expected to live.

Of a total 2,790 million population of the world, 801.3 millions or 28.7 percent have an estimated average life expectancy at birth of 50 years; 278.5 million or 10 percent, between 50 and 64 years; and 713.9 million or 25.6 percent, 65 years or more. For more than a third of the world's population, 996.3 millions, data are insufficient to make an estimate.

Since mortality data are not good enough to compute satisfactory life tables for most countries, many computed values used to derive this chart are questionable. However, they do indicate the magnitude of the problem for about 65 percent of the world's population. For the remaining 35 percent, although statistics are unknown, under existing disease conditions the chances of survival to old age are poor.

LIFE EXPECTANCY AT BIRTH



TOTAL WORLD POPULATION - 1957 (ESTIMATED) - 2790 MILLIONS

Life expectancy less than 50 years - 801.3 millions (28.7%)
Life expectancy 50 to 64 years - 278.5 millions (10.0%)
Life expectancy 65 years and over - 713.9 millions (25.6%)
Data on life expectancy not available - 996.3 millions (35.7%)

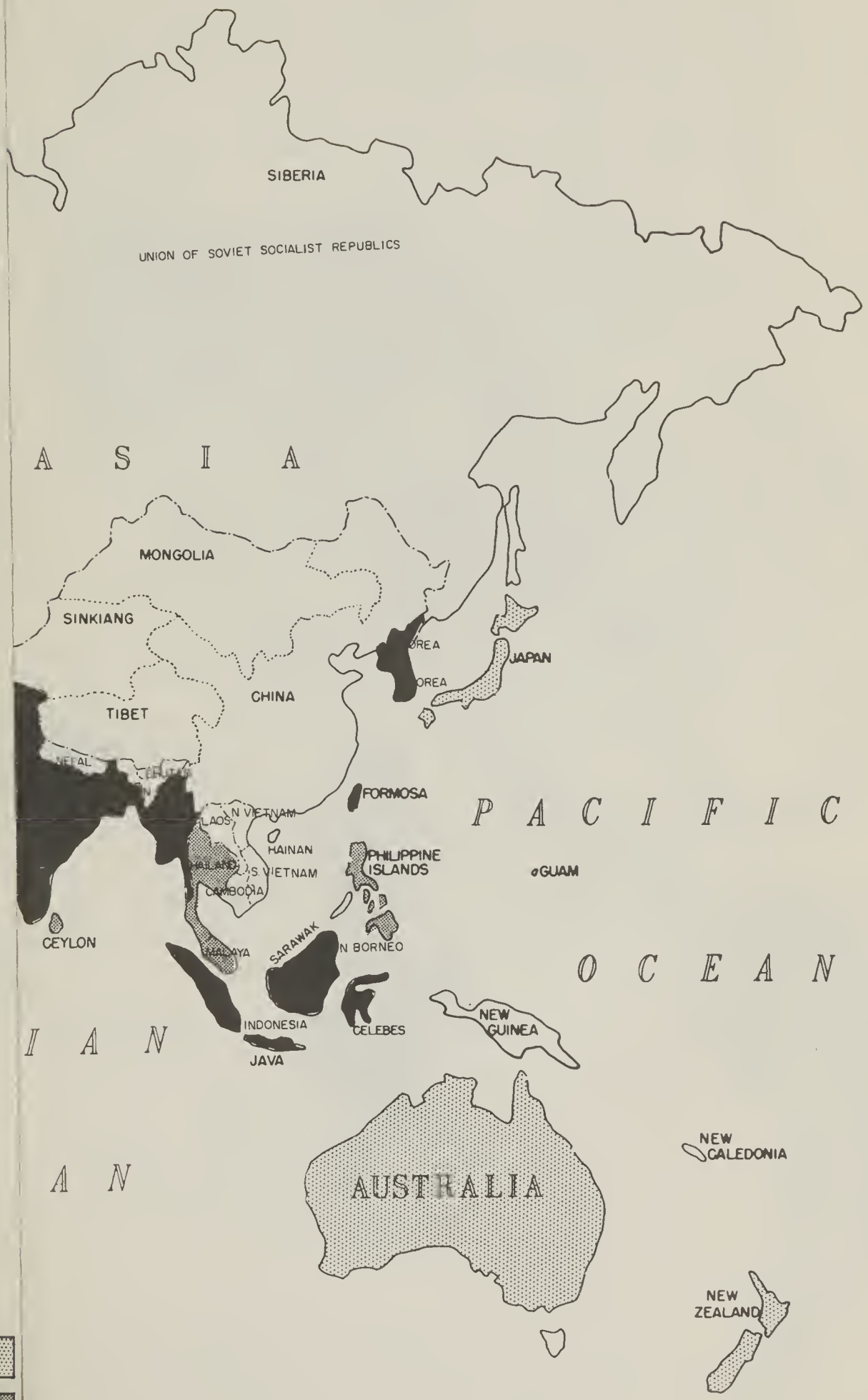
Source: U.N. Statistical Office, 1958

E. LIFE EXPECTANCY AT BIRTH BY GEOGRAPHICAL AREAS

As is to be expected, life expectancy rates are highest in the more industrially advanced countries of Europe, North America, Australia, and Japan. Norway tops the list with 73, and Sweden, the Netherlands, the United Kingdom, Denmark, U.S.A., New Zealand, Israel, and Australia have all reached 70 or more. The reported rate for U.S.S.R. is 66 years.

The 50 to 64-year-age group includes most of Central America; the southern half of South America, plus Ecuador and British Guiana; Spain; Portugal; Eastern Europe and Turkey; the Sudan and South Rhodesia in Africa; Ceylon, Thailand, Malaya, and the Philippines.

The under 50 group includes the rest of Central and South America; probably (though exact data are lacking) most of Africa, as well as southwest Asia; south and southeast Asia plus Taiwan, and Korea. India, with nearly 400 million people, has next to the lowest reported life expectancy rates, 32 years, Northern Rhodesia is lowest with a life expectancy rate of 28 years. Others in the under 40 group include Haiti, 33; Burma, 35; Pakistan, 35; Guinea, 36; Uganda, 37; Congo, 39; and Egypt, 39.



35048 O - 59 (Face p. 18)

Source: U. N. Statistical Office, 1958

LIFE EXPECTANCY AT BIRTH

Life expectancy of 65 years or more
Life expectancy of 50-64 years
Life expectancy of less than 50 years
Data unavailable

35048 O - 59 (Face p. 18)

Source: U. N. Statistical Office, 1958

PART 3. SPECIFIC DISEASE PROBLEMS

A. PREDOMINANT DISEASES IN THE FOUR MAJOR TEMPERATURE BELTS OF THE GLOBE

In the geographic distribution of diseases throughout the world, according to the Woytinskys there are four broad regions which follow roughly four separate isothermic paths around the globe. These are:

(1) The temperate climate regions, with the total population of approximately 750 million, form a belt in the Northern Hemisphere, stretching from the United States eastward through Europe over the top of Asiatic Russia to Japan, with the addition of Australia and New Zealand. Here, the most prevalent diseases are heart disease, cancer, tuberculosis, pneumonia, influenza, syphilis, and diabetes.

(2) The tropical belt with over 1,200 million people, or nearly half the population in the entire world, includes a large part of South America and the Caribbean, central Africa, and a great proportion of Asia. These areas are ravaged by malaria, amebiasis, bacillary dysentery, hookworm, yaws, and leprosy. They also suffer from tuberculosis and syphilis.

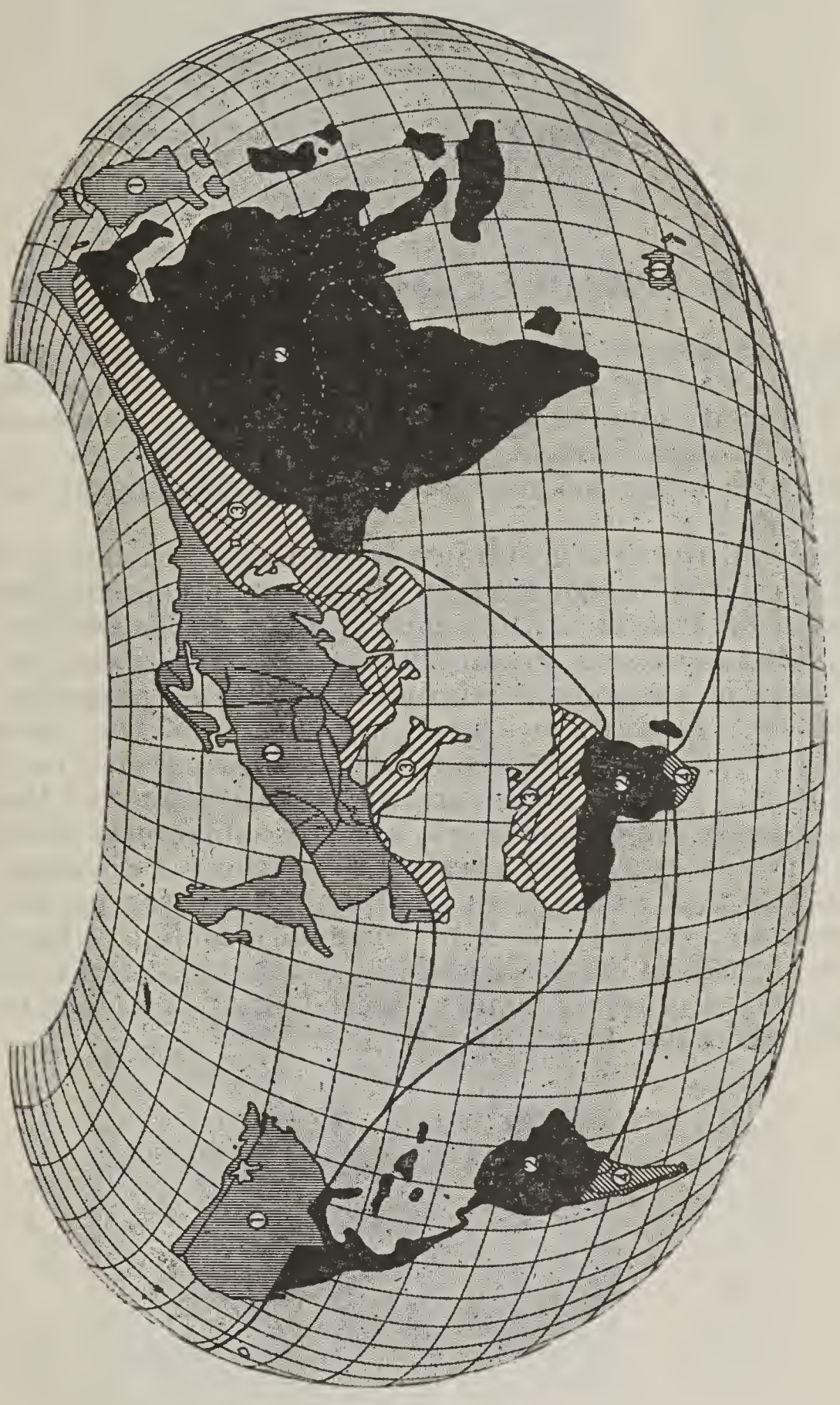
(3) Between these two belts lies a wide strip that includes the Mediterranean Basin, the Near East, Siberia, Manchuria, and the northwestern part of mainland China, with a total population of approximately 370 million. In addition to the illnesses prevailing in the adjacent areas, this region suffers from dysentery and contagious skin and eye diseases, especially trachoma.

(4) The southern belt includes the extreme southern part of South America and Africa with the population of 80 million. Here, the prevailing diseases are typhoid fever, influenza, tuberculosis, syphilis, and certain worm infections.

NOTE.—Population estimates based on 1950 data.

DISEASE IN THE WORLD: THE FOUR REGIONS

(A distorted map showing continents and countries on the scale of their population in 1950)



Source " World Population and Production " by Woytinsky and Woytinsky, 1953

B. SPREAD OF INFECTIOUS DISEASES

Infectious diseases may be divided into three major groups on the basis of the way the disease is acquired: (1) By exposure to organisms carried in contaminated food or water or found on contaminated soil; (2) by arthropod (insects, ticks, mites, etc.) vectors; (3) by direct contact with other infected individuals (including airborne droplet transmission).

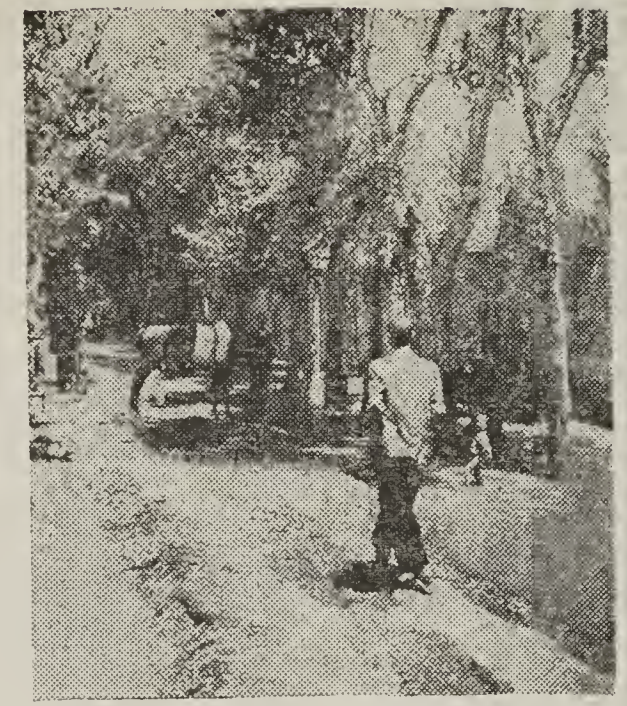
In general, the first group involving contamination of food, water, or soil, is related to poor environmental sanitation—improper disposal of human or animal wastes, lack of water-treatment facilities, and inadequate procedures for handling and protecting food supplies.

The second category, arthropod-transmitted diseases, is related directly to the prevalence and distribution of the various species involved. Generally, this is a function of the climatic conditions favorable to the vectors which prevail, so that many of these diseases are much more important in tropical and subtropical areas.

The third category, the so-called social contact diseases, frequently is related to poor housing which accompanies overcrowding and intimate contact, poverty, lack of personal cleanliness, ignorance, and absence of medical care. In addition to direct control operations, the first and third groups require a well-planned and executed program of health education to assure real progress.

INFECTIOUS DISEASES ARE SPREAD BY —

FOOD, WATER & SOIL



Typhoid, Schistosomiasis, Cholera, Amebiasis, Bacillary Dysentery, Diarrheas Poliomyelitis, Hookworm, Roundworms, Tapeworms,

INSECTS

Malaria, Filiariasis, Typhus, Sleeping Sickness, Plague, Leishmaniasis, Dysentery, Yellow Fever, Dengue, Relapsing Fever, Tsutsugamushi, Onchocerciasis, Rocky Mountain Spotted Fever, Encephalitis, Rickettsial Pox

SOCIAL CONTACT

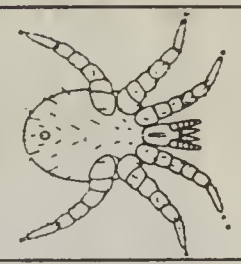
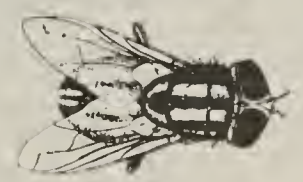
Yaws, Tuberculosis, Syphilis, Smallpox, Measles, Diphtheria, Trachoma, Influenza, Leprosy, Common Cold, Pneumonia, Scarlet Fever, Whooping Cough

C. INSECTS CARRY DISEASE

Many of the diseases which are prevalent in the less-developed areas and which have, in fact, inhibited the development of the countries involved, are transmitted by various species of arthropods, including mosquitoes, fleas, lice, ticks, mites, and various species of flies. When one considers such diseases as malaria, yellow fever, filariasis, plague, endemic and epidemic typhus, kala-azar, bacillary dysentery, sleeping sickness, trachoma, and others, the control of insects assumes major importance in international health programs.

The method of transmission by arthropods varies tremendously with the different diseases. In some cases, purely mechanical transmission of pathogenic organisms on the feet or mouthparts of the insect occurs, such as in bacillary dysentery and cholera carried by flies. In others, there is a complex relationship in which the insect is necessary in the life cycle of the disease agent—malaria, yellow fever, and filariasis in mosquitoes, sleeping sickness in tsetse flies, and others. The control of each insect-transmitted disease presents a separate problem based upon a complete knowledge of the arthropod and the disease agent. In many cases, this imposes a heavy burden of expense on many of the poorer countries where the need for specific knowledge and efficient application is greatest.

INSECTS CARRY DISEASE

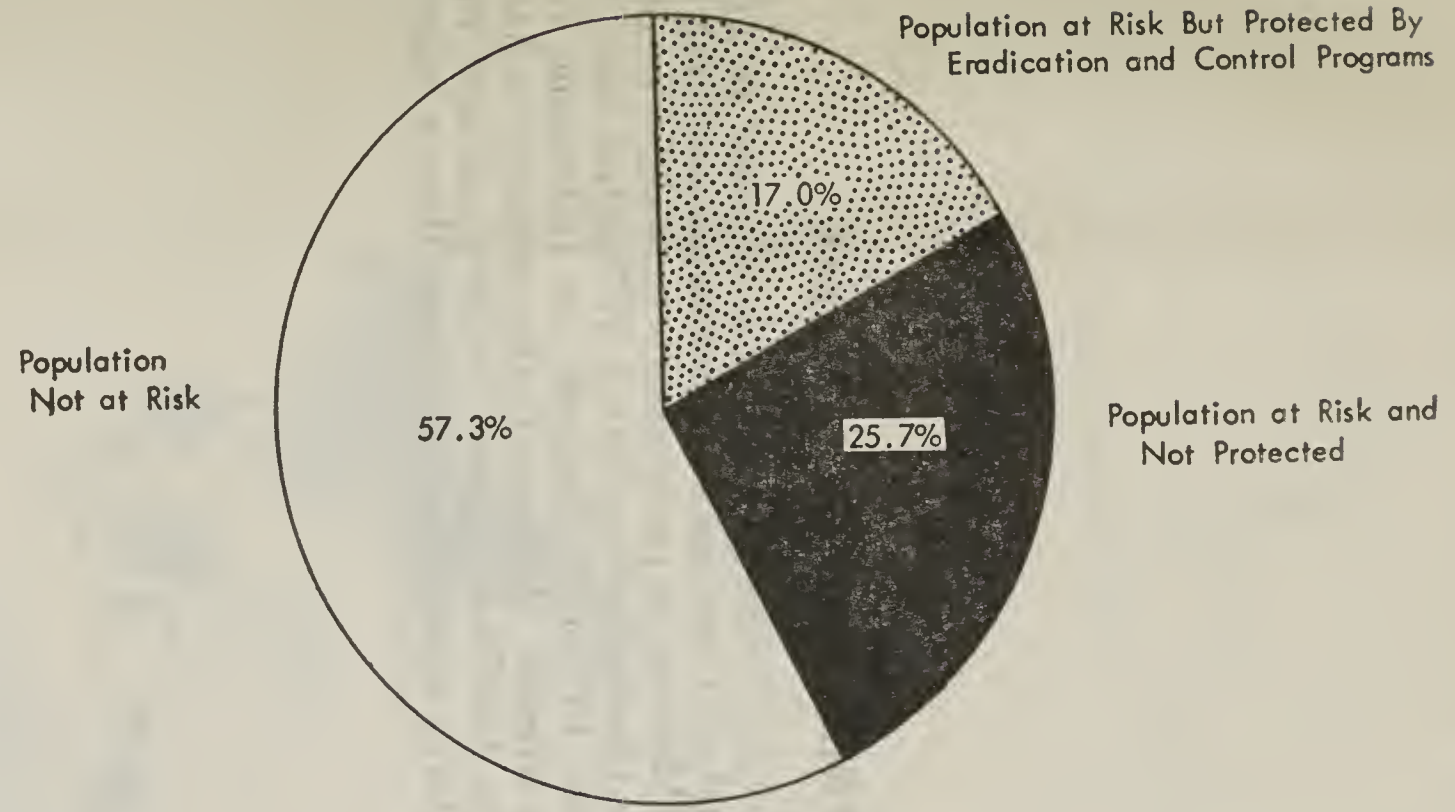
INSECT		DISEASE	INSECT		DISEASE
Mosquito		. Malaria . Yellow Fever . Dengue . Encephalitis . Filariasis	Mite		. Rickettsial Pox . Scrub Typhus . Scabies
Flea		. Plague . Endemic Typhus	Sand-fly		. Kala-azar . Sandfly Fever . Oroya Fever
Louse		. Epidemic Typhus . Relapsing Fever	Cone-nosed bug		. Chagas' Disease
Tick		. Rocky Mountain Spotted Fever . Relapsing Fever . Tularemia . Colorado Tick Fever . and others	Fly		. Bacillary Dysentery . Trachoma . Sleeping Sickness . Cholera . Onchocerciasis . and others

D. EXTENT OF THE MALARIA PROBLEM

Malaria is a chronic, debilitating disease transmitted by species of the *Anopheles* mosquito. It is estimated that at least 250 million people annually suffer clinical attacks of malaria and that each year perhaps 2.5 million of them die of the disease. Though often a direct cause of infant mortality and an indirect cause of deaths of all ages by lowering the resistance to other infections, the greater impact of malaria on a population lies in its debilitating effects. By limiting the number of conceptions and by causing abortions and stillbirths, malaria affects the birthrate as well as holding down the level of life expectancy. For those patients who survive clinical attacks, it is a continuing drain on physical energy and undoubtedly results in mental retardation. In those countries where malaria is highly endemic, it unquestionably retards the economic development and productivity of the nation.

Nearly half the population of the world (well over a billion persons) live in areas where they are exposed to malaria. Under the WHO malaria eradication and control programs, some 466 million people (17 percent of the total population) are, to a greater or lesser extent, protected against the risk, but the remaining 700 million or so (25.7 percent) as yet have no real protection.

EXTENT OF MALARIA PROBLEM

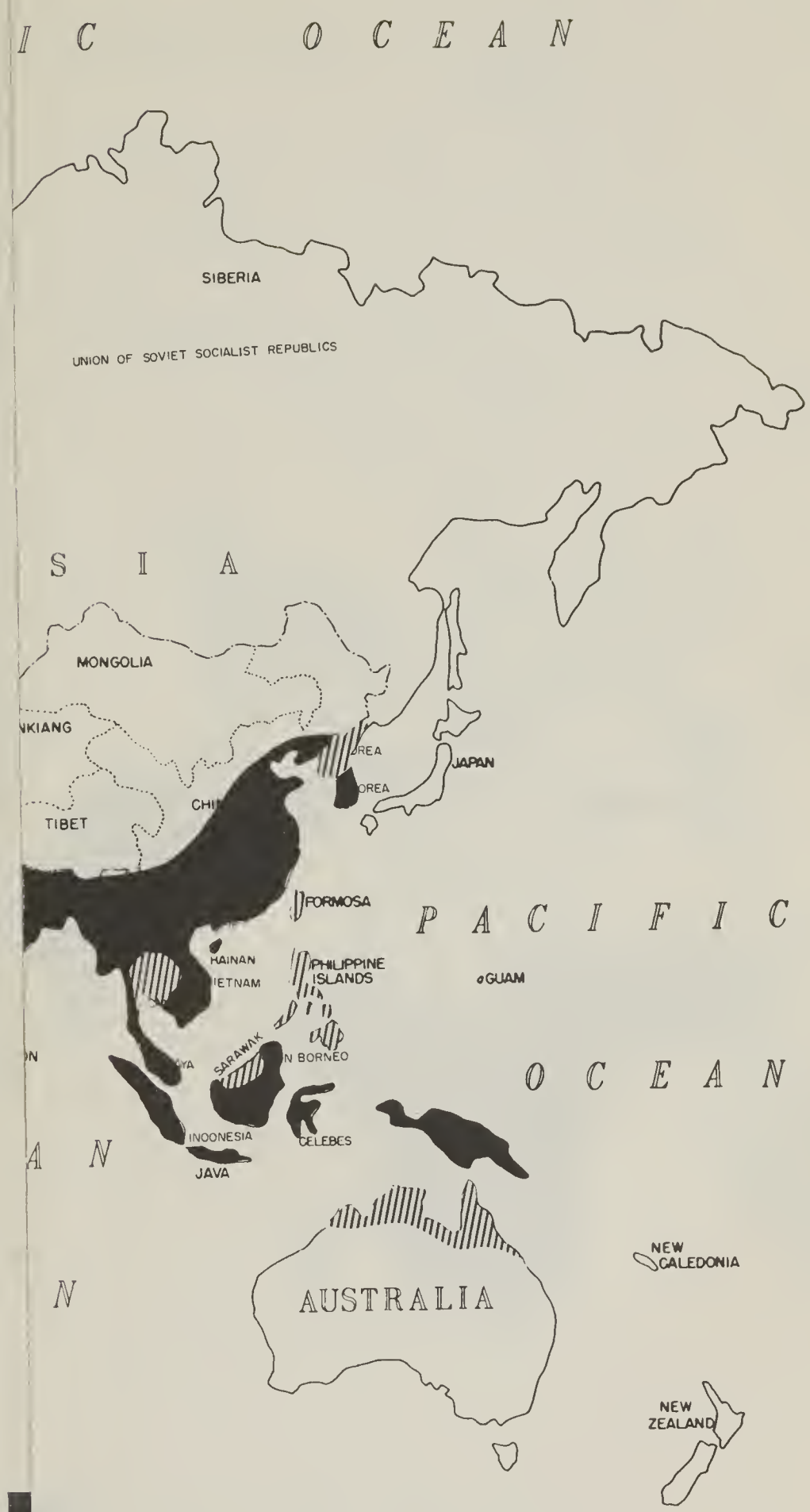


World's Total Population	2737 Millions
Population Not at Risk	1568.9 Millions
Population at Risk But Protected	466 Millions
Population at Risk, Not Protected	702.1 Millions

Source of data: WHO International Protection Against Malaria, 1957

E. DISTRIBUTION OF MALARIA

Though the regions in which the population is exposed to malaria are gradually being restricted, there are still vast areas in which it is a major health problem. Malaria is particularly prevalent in certain countries of the Western Hemisphere situated 15° either side of the Equator, in Asia south of 40° north latitude, in Indonesia, in the southwest Pacific, and in Africa. Malaria is also endemic in Mexico, Central America, and the Caribbean area; in Portugal and Spain; in the Balkans; and in a large segment of southeast Russia below the 60th parallel.



35048 O - 59 (Face p. 28)

World Problem" by Pampana and Russell, WHO 1955

DISTRIBUTION OF MALARIA

Areas of high endemicity

Areas of reduced endemicity, but control operations still necessary

Areas where malaria has never occurred or has been essentially eradicated

Source: Adapted from "Malaria-A World Problem" by Pampana and Russell, WHO 1955
WHO Publications
ICA unpublished data

35048 O - 59 (Face p. 28)

F. STATUS OF MALARIA ERADICATION

For many years malaria control programs have been in operation in various countries of the world. In 1955, WHO launched a program aimed ultimately at the total eradication of the disease.

As of September 1958, of the 1,168 million people formerly exposed to malaria, about 52 million (4.4 percent) in 9 countries have been essentially freed from the risk and 589 million (approximately 50 percent) in 53 countries are benefitting from programs in various stages of development. For still another 125 million (about 10 percent) in 14 countries, programs are being planned. This leaves slightly over 400 million people (some 34 percent of the population at risk) in 64 countries for whom malaria eradication programs are not yet in the planning stage.

Either malaria morbidity and mortality have declined tremendously or else malaria has been eradicated in formerly malarious parts of Brazil, British and French Guiana, Chile, Cyprus, Greece, Italy, Mauritius, Venezuela, the U.S.A. and Yugoslavia. In wide areas of Bombay and the Mysore States in India and throughout Ceylon, transmission has been almost completely interrupted by modern control methods.

Despite the tremendous advances on a global basis which have been made in its control, malaria still must be considered as one of the most acute, if not the worst, of the important health problems in the world today.

STATUS OF MALARIA ERADICATION ON 1 SEPTEMBER 1958

	NUMBER OF COUNTRIES OR TERRITORIES	TOTAL POPULATION (in millions)	POPULATION AT RISK* COVERED BY THE ERADICATION PROGRAM (in millions)
Eradication Practically Achieved	9	234.3	51.8
Eradication Very Advanced	7	43.7	13.1
Eradication Being Implemented	46	873.4	576.0
Eradication Being Planned	14	203.2	125.3
Totals	76	1354.6	766.2
Eradication Not Yet Planned	64	1076.2	401.9 (not covered by program)

World's Total Population (1956 estimate)..... 2737 Millions

Total Population at Risk (living in areas where malaria is still, or has recently been, endemic)..... 1168.1 Millions

Population Actually Protected in 1957 is Estimated to be at Least..... 466.0 Millions

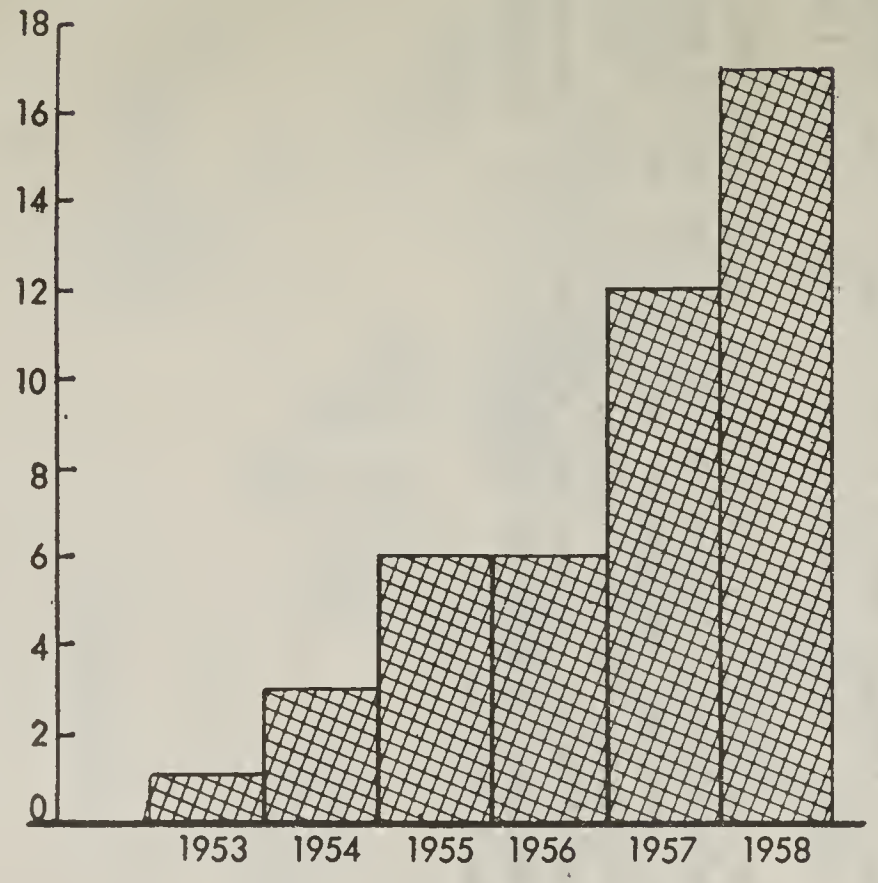
*Estimated

Source: WHO Report of Expert Committee on International Quarantine. International Protection Against Malaria WHO/IQ/67 - Oct. '58.

G. INSECT RESISTANCE

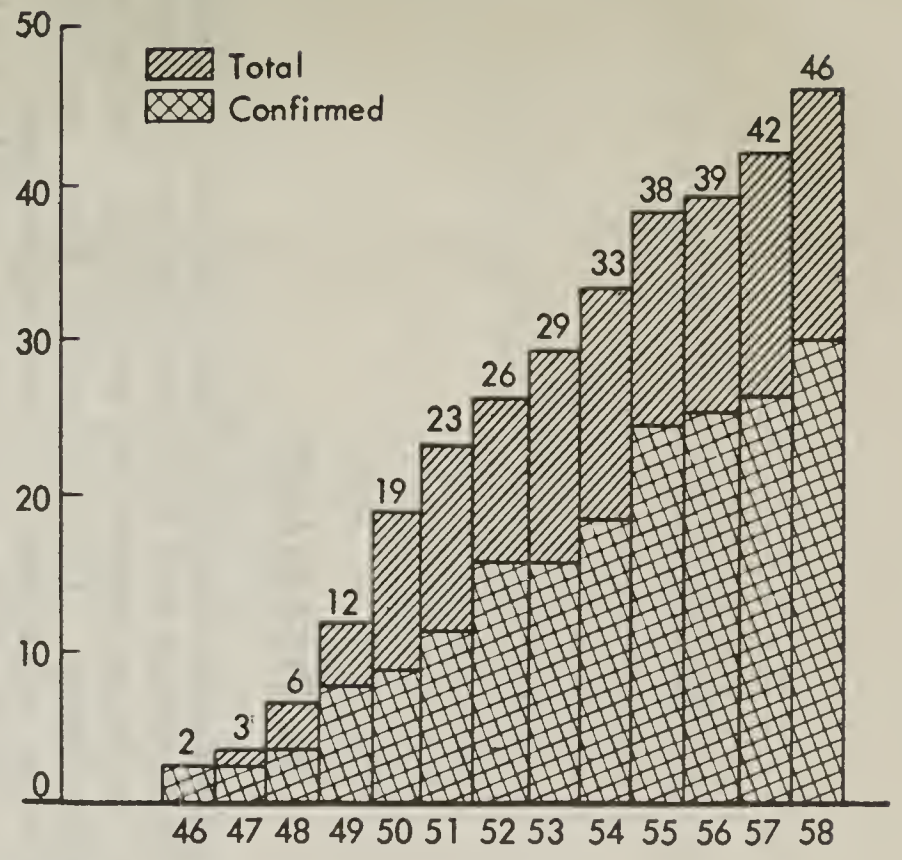
The early successes with DDT and other new insecticides after World War II led to optimism and the hope that at least some of the insect vectors of disease might be eradicated. In 1947 and 1948, it became apparent that some insects of public health importance were becoming resistant to DDT. Starting with houseflies, which have since been reported resistant in more than 30 countries, the phenomenon was observed in other species of insects, including mosquitoes, lice, fleas, bedbugs, and cockroaches, with a total of 46 species now having been reported as resistant to one or another insecticide.

This has had a definite impact on the progress of control operations against insect vectors. For example, important vectors of malaria (nine species of *Anopheles*), in 17 different countries have been confirmed as physiologically resistant to insecticides. For this reason personnel must be continuously at work developing new insecticides which will be economical, nontoxic to man, and adaptable to existing or new techniques of insect eradication.



Cumulative number of countries with confirmed physiologically resistant vectors of malaria

Countries: Burma, El Salvador, French West Africa, Greece Guatemala, India, Indonesia, Iran, Iraq, Lebanon, Liberia, Mexico, Nicaragua, Nigeria, Saudi Arabia, Trinidad, United States



Cumulative number of arthropods of public health importance physiologically resistant to insecticides

* Includes flies, mosquitoes, bedbugs, lice, fleas and cockroaches

Sources: WHO Publications
PHS Records

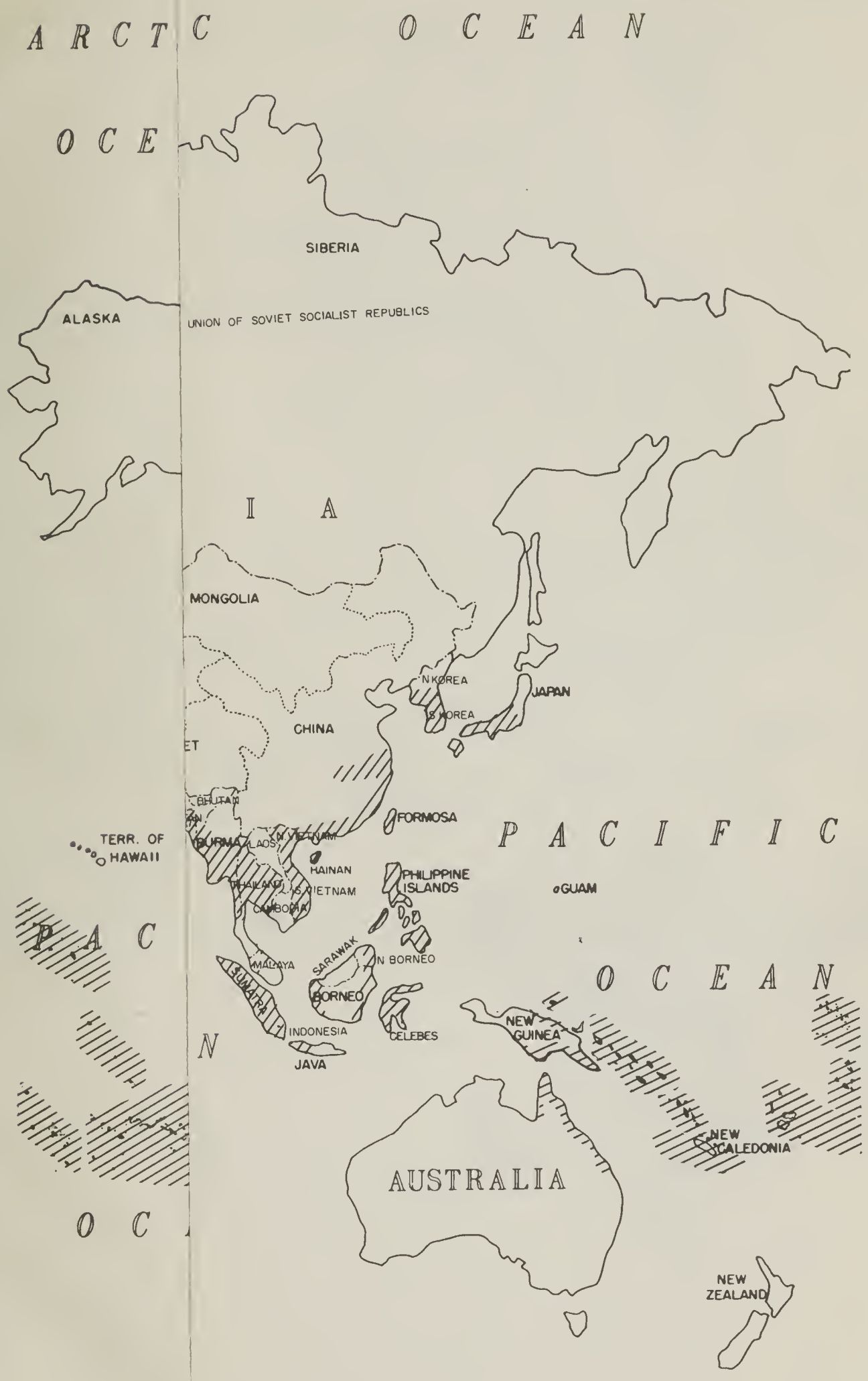
H. FILARIASIS

The term filariasis encompasses a group of parasitic worm infections, two of which (Bancroft's filariasis and Malayan filariasis), involve the lymph glands and may result in tremendous swelling of the limbs and genitalia—termed elephantiasis. This deformity may partially or completely incapacitate the individual for productive work.

More than 250 million people in the tropical areas of the world are believed to be infected. The greatest prevalence occurs in central Africa, parts of South America, southeast Asia, and the South Pacific islands. It is also reported in Central America and the West Indies, some parts of southern Europe, the Mediterranean coast of Africa, and in Japan and Korea. During World War II this disease assumed military significance when troops stationed in the South Pacific became infected.

Experimental studies carried out in the Pacific area show that the disease can be effectively brought under control by the use of piperazine derivative drugs, provided treatment campaigns are organized on a mass basis. So far, however, the overall effort has been limited. Eventual success for worldwide control will depend upon the availability of funds and medical personnel to organize such campaigns in the various countries involved.

HANTIASIS)



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ases - Plate 4, American Geographical Society, 1952

DISTRIBUTION OF FILARIASIS (PRODUCING ELEPHANTIASIS)

Source: Adapted from Atlas of Distribution of Diseases-Plate 4, American Geographical Society, 1952

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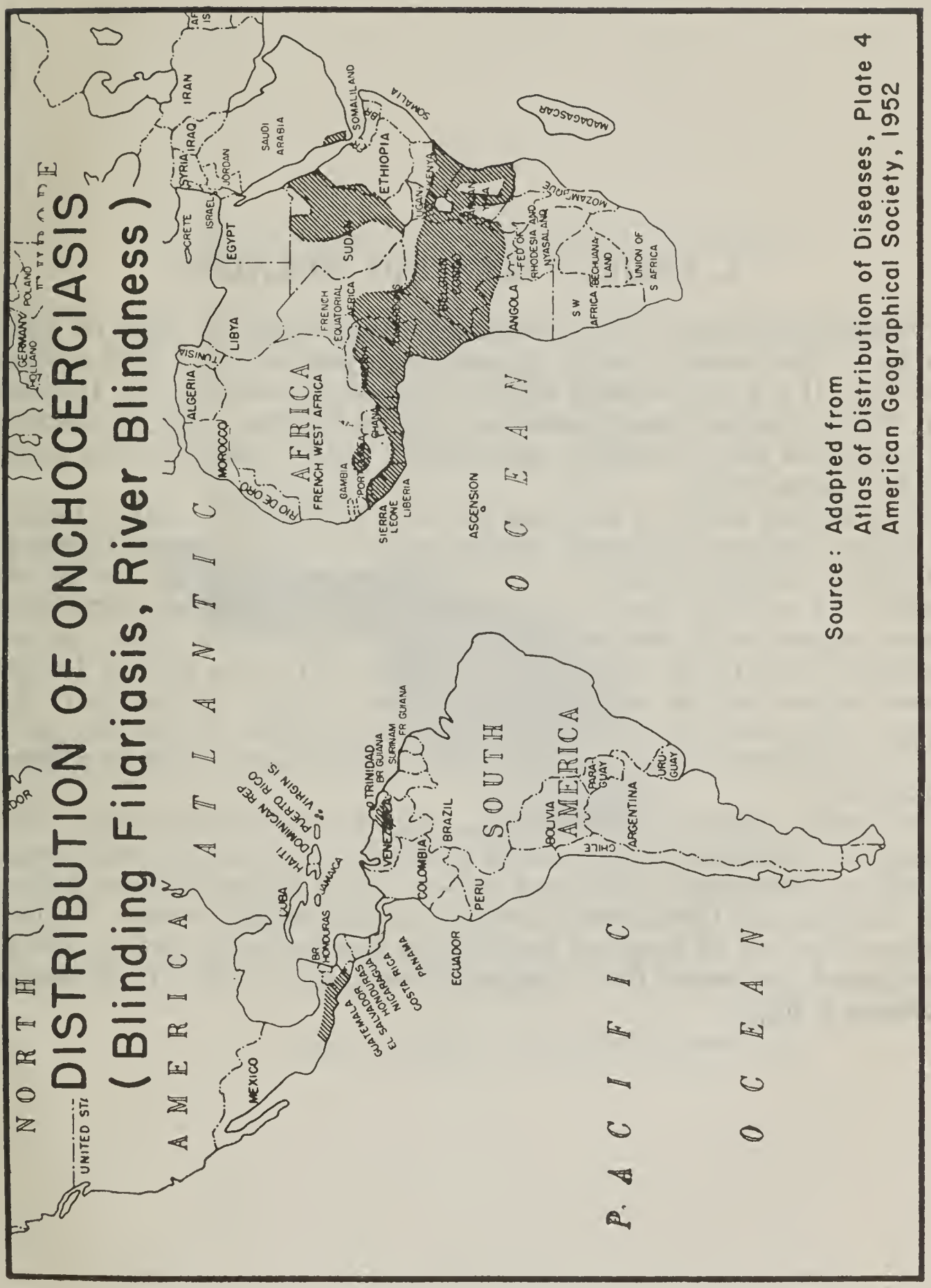
I. ONCHOCERCIASIS

Onchocerciasis (blinding filariasis, river blindness), is caused by a small worm which causes nodules in the skin, usually on the head and trunk. Hundreds of thousands of tiny embryos (microfilariae) are released from the nodules into the surrounding tissues. When these microfilariae migrate to the eye, impaired vision and frequently total blindness result. The disease is transmitted by several species of gnats (*Simulium*) which breed in rapidly flowing streams—hence, the name "river blindness."

Onchocerciasis affects nearly 20 million people in Africa, Central and South America, involving up to 80 to 100 percent of the population in limited areas. In Central America, the disease occurs on the Pacific slopes of 3 states in Guatemala and 2 in Mexico. In South America, it is localized in the north-central portion of Venezuela. In Africa, onchocerciasis extends from Sierra Leone and Liberia southward through Ghana, Nigeria, and the Cameroons to the Belgian Congo; then east across central Africa to Uganda, Kenya, Nyasaland, and Tanganyika with a northward extension up through Sudan and western Ethiopia.

Through the use of new drugs in mass campaigns, considerable progress has been made in the control of the disease in Africa and the Americas, and surgery has helped reduce its damaging effects in Guatemala and Mexico. Insecticide campaigns to exterminate the disease-carrying flies have been initiated in Kenya and other parts of Africa with some indication of success.


DISTRIBUTION OF ONCHOCERCIASIS
(Blinding Filariasis, River Blindness)
NORTH
AMERICA
ATLANTIC
OCEAN
UNITED STATES
MEXICO
GUATEMALA
EL SALVADOR
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
BR HONDURAS
CUBA
HAITI
DOMINICAN REP
PUERTO RICO
VIRGIN IS
JAMAICA
TRINIDAD
VENEZUELA
COLOMBIA
BR GUIANA
SURINAM
FR GUIANA
BRAZIL
ECUADOR
PERU
BOLIVIA
PARAGUAY
CHILE
ARGENTINA
URUGUAY
SOUTH
AMERICA
PACIFIC
OCEAN
AFRICA
FRENCH WEST AFRICA
GAMBIA
PORTUGUESE GUINEA
SIERRA LEONE
LIBERIA
GHANA
RIO DE ORO
MOROCCO
ALGERIA
TUNISIA
LIBYA
FRENCH EQUATORIAL AFRICA
SUDAN
EGYPT
ISRAEL
JORDAN
SYRIA
IRAQ
IRAN
CRETE
SAUDI ARABIA
ETHIOPIA
SOMALILAND
SOMALIA
BELGIAN CONGO
UGANDA
KENYA
ANGOLA
FED OF RHODESIA AND NYASALAND
MOZAMBIQUE
SW AFRICA
BECHUANALAND
UNION OF S AFRICA
MADAGASCAR
ASCENSION
POLAND
GERMANY
HOLLAND
Source: Adapted from
Atlas of Distribution of Diseases, Plate 4
American Geographical Society, 1952

J. AFRICAN SLEEPING SICKNESS

Sleeping sickness (trypanosomiasis) is prevalent in most of Africa, south of the Sahara, except the southern part of the Union of South Africa. It is a particularly virulent disease, transmitted by the tsetse fly, which numbers many people among its victims. The forms found in man also affect animals, particularly cattle; certain other species affect animals only.

The overall effect of sleeping sickness among the rural population and their domestic animals constitutes one of the greatest barriers to African economic progress. It so debilitates and kills the infected individual and his stock that productivity is seriously diminished. Large segments of the population have tended to migrate to areas relatively free of the tsetse fly. This, in turn, has served to overcrowd areas having an already low per capita agricultural yield. Populations are deprived of needed animal protein in the diet, of the service of draft animals for work, and of fertilizer needed to cultivate the fields.

Formerly, sleeping sickness was almost inevitably fatal. Now, however, the use of drugs makes possible a cure in the early stages. Modern chemoprophylaxis and public health measures have reduced the incidence of the human disease in many endemic areas. In other regions the use of residual insecticides has reduced, and sometimes eradicated, the tsetse fly. Despite these gains, the toll from sleeping sickness is high.

DISTRIBUTION OF SLEEPING SICKNESS

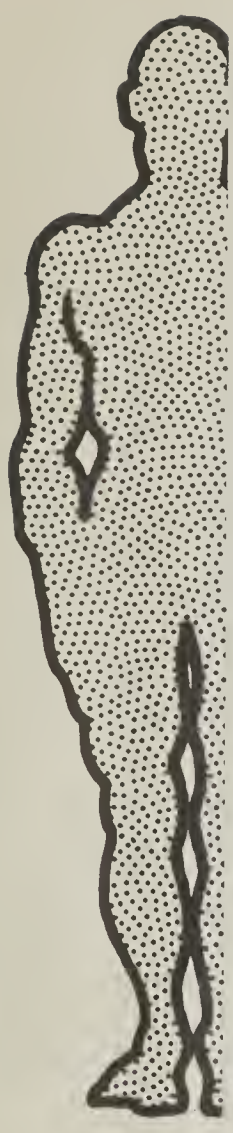
Source: Adapted from Global Epidemiology

K. YELLOW FEVER

Yellow fever, no longer a scourge of mankind that it once was in Europe, Africa, and the Americas, continues to be a serious menace to health on both sides of the Atlantic. Classic urban yellow fever, which was responsible for devastating epidemics prior to about 1910, has been brought virtually under control in most of the New World countries by intensive eradication campaigns aimed at the domestic yellow fever mosquito, *Aedes aegypti*. This same intensive effort, however, has not been employed in the endemic areas in Africa.

Jungle yellow fever, basically a disease of forest animals but caused by the same virus, was recognized about 25 years ago. This presents a more complicated epidemiological picture in which the disease is perpetuated in monkeys and primarily transmitted by species of forest mosquitoes which breed and bite in the forest canopy. Humans working or living in jungle areas may be infected by the bites of these mosquitoes, and may carry the disease back to urban areas where *Aedes aegypti* is present in sufficient numbers to sustain an epidemic. In some areas, this presents the constant threat of the reestablishment of the vicious epidemic type of yellow fever.

Jungle yellow fever is thoroughly entrenched in much of central Africa, and in the Amazon Valley in Brazil and other parts of South America. From 1947 to 1956, 1,350 fatal cases of jungle yellow fever were reported from 13 American countries. Recent years have seen the northward movement of this disease in animals from Panama into Guatemala with occasional human cases.



CY(

MAN • *A. AE(*

MAN GOES I(
ARE PRESENT

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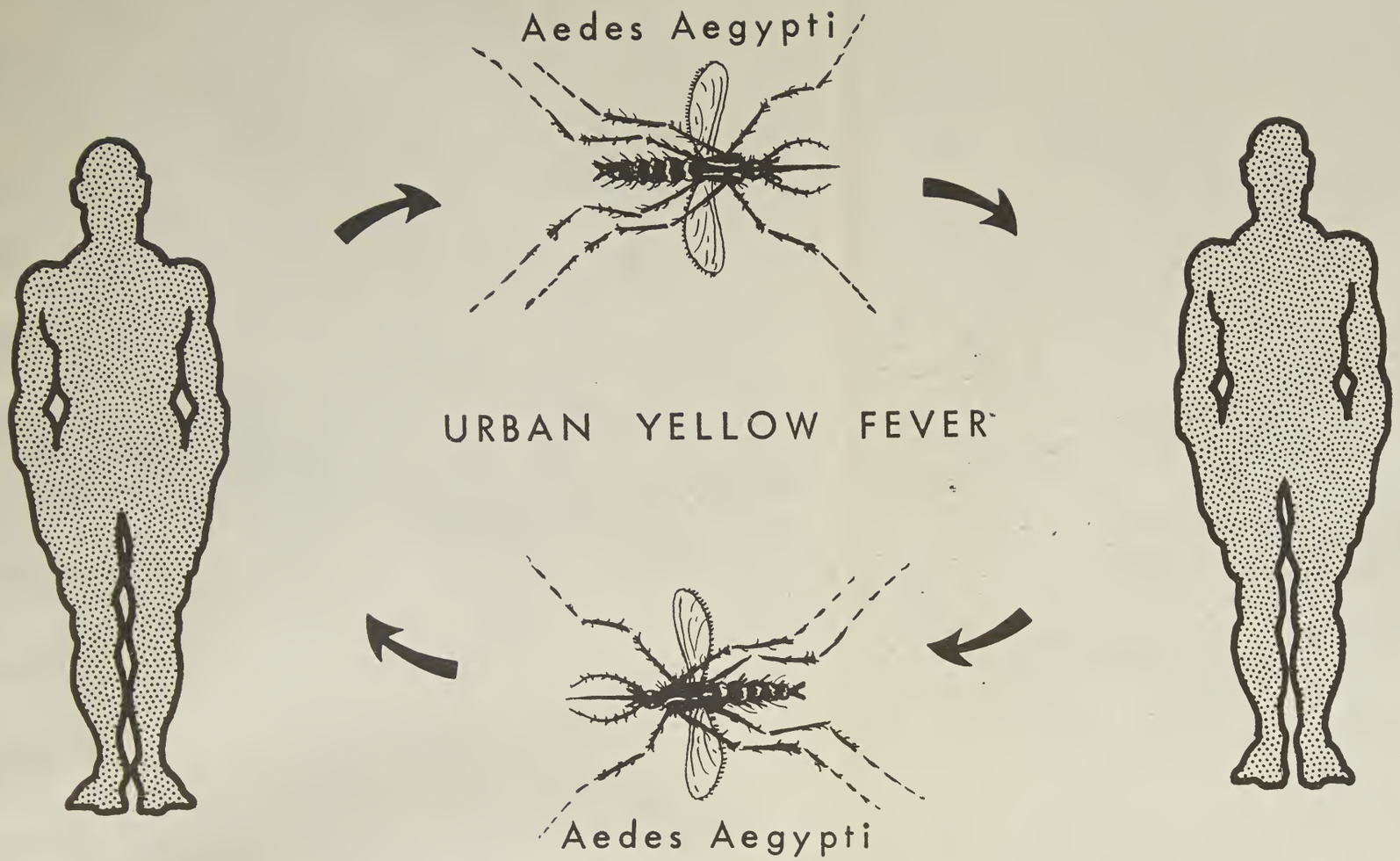


JUNGLE YELLOW FEVER
(Adapted from Karl F. Meyer, '55)

CYCLE

MAN • *A. AEGYPTI* • MAN

CYCLE

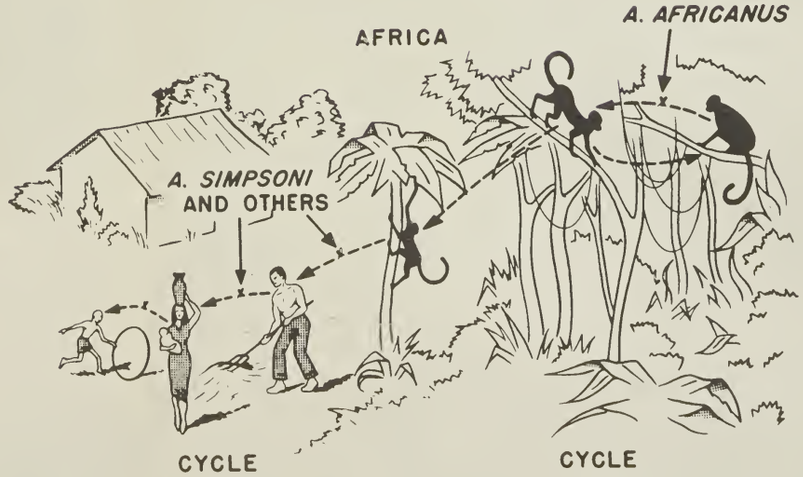
HAEMAGOGUS AND

MONKEYS MARSUPIALS? | PROBABLY OTHER MOSQUITOES | MONKEYS MARSUPIALS?

MAN INFECTED BY ENTERING JUNGLE

JUNGLE TO URBAN

MAN GOES INTO JUNGLE, BECOMES INFECTED, RETURNS HOME, AND IF *A. AEGYPTI* ARE PRESENT MAY INITIATE THE URBAN OR MAN-MOSQUITO-MAN CYCLE



CYCLE

A. SIMPSONI

MAN | *A. AEGYPTI* AND PROBABLY OTHER *AEDES* | MAN

CYCLE

A. AFRICANUS

MONKEY | AND POSSIBLY OTHER *AEDES* | MONKEY

MAN RARELY INFECTED IN JUNGLE

JUNGLE TO URBAN

MOSQUITOES NEAR HUMAN HABITATIONS BECOME INFECTED FROM MARAUDING MONKEYS AND IN TURN INFECT MAN, THUS INITIATING MAN—MOSQUITO—MAN CYCLE

35048 O - 59 (Face p. 40)

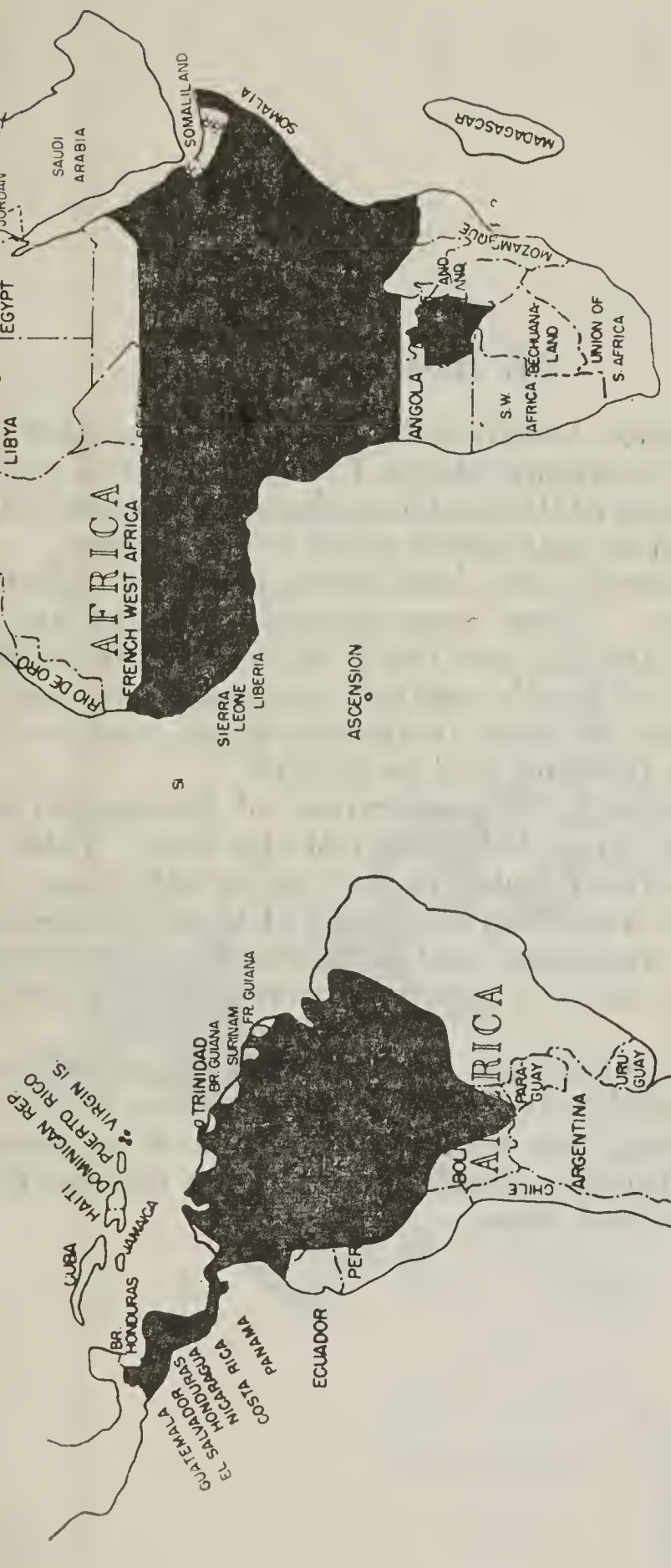
L. DISTRIBUTION OF YELLOW FEVER

Essentially all of tropical Africa between 15° N. latitude and 10° S. latitude, along with a portion of Northern Rhodesia, can be considered as infected with yellow fever (urban and jungle) although numbers of reported cases vary considerably from year to year.

In South America urban yellow fever has been almost nonexistent in recent years. The jungle form of the disease still persists, however, in the Amazon Valley and other parts of Brazil, in parts of the other countries adjoining Brazil, and in Middle America as far north as Guatemala.

Yellow fever is without parallel in its potentialities for disrupting trade and commerce. The wide natural distribution of the transmitting mosquito, the ease with which persons exposed to the disease may be transported to distant ports within the incubation period and the capability of the virus of producing explosive outbreaks if introduced into the local mosquito population cause air and sea transport to avoid ports in which the disease has been reported recently.

DISTRIBUTION OF YELLOW FEVER



Source: Adapted from WHO supplement to weekly epidemiological record, R.E.H. No. 300, 1952

M. HOOKWORM

Hookworm infection traditionally has been associated with population groups of low economic status living in tropical and subtropical climates and, in terms of its incidence, distribution, and clinical effects, has long been rated as mankind's worst worm disease.

Worldwide in distribution, hookworm probably infects upward of 400 million persons. Areas most severely affected are countries in Middle and South America and the West Indies, tropical and southern Africa, and much of south central, southeast and east Asia. The infection also occurs in more temperate areas, such as Southeastern United States, the Balkans, and in Poland.

Infection is acquired by penetration of hookworm larvae living in the soil, usually through the skin of the feet. Thus, the wearing of shoes is an important factor in preventing infection. Linked with deficient diet, even moderate infections of these blood-sucking worms produces anemia, weakness, and listlessness. The infected individual's ability to produce is greatly lowered with a resultant cut in earning capacity.

Mass treatment campaigns coupled with improved environmental sanitation and health education activities have been shown to be effective in reducing the hookworm burden of a population to a minimum level, although complete eradication has not been achieved except in circumscribed areas.

Source: Adapted from American Geographical Society
Atlas of Distribution of Disease

35048 O - 59 (Face p. 44)

DISTRIBUTION OF HOOKWORM

Source: Adapted from American Geographical Society Atlas of Distribution of Disease

35048 O - 59 (Face p. 44)

N. SCHISTOSOMIASIS

Schistosomiasis, involving an estimated 150 million persons in the tropics and subtropics, is a debilitating parasitic disease caused by several species of small worms, called blood flukes. The disease is most prevalent across tropical Africa, along the Mediterranean coast, in the Nile Valley (especially the Nile Delta), along the Yangtze River of the China mainland, in Japan and certain of the Philippine Islands, and in Puerto Rico, Venezuela, and Brazil in the Western Hemisphere.

Infection with these worms is acquired by penetration of aquatic larval forms through the skin. Various species of snails (mollusks) serve as intermediate hosts. The adult worms live in the smaller blood vessels of the intestine or the bladder and result in moderate to severe tissue damage in these areas, in the liver, and occasionally other parts of the body. Heavy infections result in emaciation, weakness, increased susceptibility to other infections, and even death.

Perpetuation of these infections depends upon contamination of water with fecal discharges and the availability of proper species of snails. The infection rate in any area can be regarded as a reliable index of the level of environmental sanitation.

Treatment is difficult, expensive, and not too effective so that control depends largely on snail eradication and education of the people. Newer molluscicides have been used in some areas with encouraging results. However, schistosomiasis, with its overall adverse effect on large segments of the population of certain countries, must be ranked as a world public health problem of major importance.

Source:
Adapted from
Atlas of Distrib
American Geog

35048 O - 59 (Face p. 46)

DISTRIBUTION OF SCHISTOSOMIASIS

Source:
Adapted from
Atlas of Distribution of Diseases, Plate 4
American Geographical Society, 1952

35048 O - 59 (Face p. 46)

O. LEPROSY

The highest rates of infection occur in warm and humid climates associated with overcrowding and poverty. However, many of the preeminent factors affecting the distribution of leprosy remain undetermined. Racial factors seem to be of some significance. Europeans and Mongolians appear to be more susceptible to the severe form of the disease whereas darkly pigmented peoples seem prone to develop the mild form. Children appear to be especially susceptible. Possibly malnourishment and dietary deficiencies may favor its onset.

Leprosy still remains an important health problem in many of the underdeveloped areas of the world. Estimates of the total number of cases in the world range from 2 to 12 million. Such a wide range is due, among other reasons, to the fact that early manifestations of the disease develop insidiously and may not be recognized for years. In most countries, measures are directed toward early diagnosis of the disease and prompt therapy, including the use of sulfones.

35048 O - 59 (Face p. 48)

Adapted from Atlas of Diseases, Plate 7, American Geographical Society, 1953

DISTRIBUTION OF LEPROSY

LEGEND

Rates per 1,000 inhabitants

- 0 – 1.0
- 1.01 – 6.0
- 6.01 and over

Adapted from Atlas of Diseases, Plate 7, American Geographical Society, 1953

35048 O - 59 (Face p. 48)

P. YAWS

Yaws, though not a veneral disease, is caused by a spirochete similar to that of syphilis. Found primarily in underdeveloped countries, the disease is associated with a low standard of living and poor sanitation. The highest prevalence occurs in a worldwide belt extending 15 degrees on either side of the Equator, although it is also found in Central America and the West Indies, in northern India and Burma, in Thailand, Laos, and Vietnam, and in the Philippines. Yaws occurs most frequently in areas of very high humidity with an annual average temperature of 80 degrees.

An estimated 50 million cases are believed to exist today. In rural areas of some countries the extent of infection may be 10 to 30 times greater than available statistics would indicate. The disease is highly disfiguring, decreases the potentiality for productive work, and begins to take its toll in early childhood.

The eradication of yaws has been a major objective of many national governments with aid from the United Nations Children's Fund and the World Health Organization. Programs using mass examination and penicillin therapy techniques are in various stages of completion in Haiti, Indonesia, Thailand, Laos, and in West Africa and the Pacific Islands.

S

A R C C O C E A N

O C E

SIBERIA

ALASKA

IST REPUBLICS

S I A

MONGOLIA

G

N KOREA

JAPAN

S KOREA

CHINA

BET

FORMOSA

P A C I F I C

TERR. G
HAWAI

HAINAN

PHILIPPINES

ETNAM

GUAM

P A C

SARAWAK

N BORNEO

O C E A N

INDONESIA

CELEBES

N

JAVA

NEW CALEDONIA

AUSTRALIA

O C

NEW ZEALAND

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Y

N

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lth Organization Monograph Series No. 15, 1953

GEOGRAPHICAL DISTRIBUTION OF YAWS

35048 O - 59 (Face p. 50)

Source: Adapted from World Health Organization Monograph Series No. 15, 1953

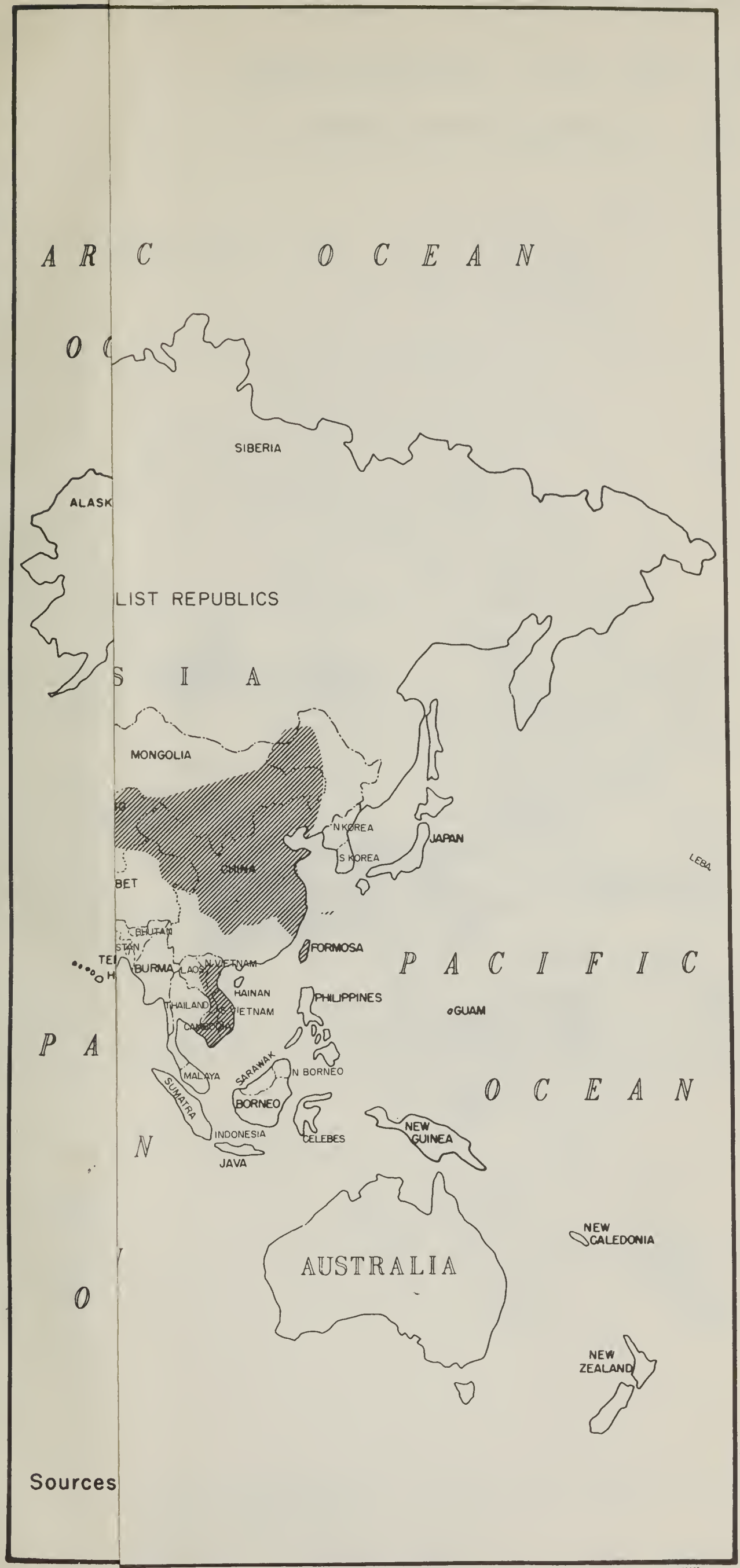
Q. TRACHOMA

Trachoma and infectious conjunctivitis are communicable diseases which produce a high percentage of blindness and disabling eye lesions if neglected. Only fragmentary statistics are available, but it is estimated that more than 400 million people—over one-seventh of the total world population—are affected. Of these an estimated 10 million will become blind.

These diseases are essentially associated with poverty, poor sanitation, and ignorance. Although they affect all age groups, the incidence in children may be especially high in certain areas. In some sections of North Africa, where practically the entire adult population is suffering from these diseases, the rates among children of preschool age are sometimes 70 to 100 percent. In India, rates in some localities have reached 78 percent and a recent survey in Taiwan uncovered a 48 percent incidence among children. New areas of endemicity have been discovered recently in South Africa and western Australia. Trachoma has been known for many years among Indians in the southwestern part of the United States but is rapidly vanishing in this country through improved sanitation and treatment.

Obviously, these diseases impose a tremendous economic burden on any country in which they are prevalent. Blindness or badly impaired vision reduces greatly the earning power and productive capacity of population groups. In Tunisia, for example, a country of 3.5 million persons and an infection rate of 40 to 50 percent, these diseases cause the loss of 25 million working days a year. Beyond that, the cost of caring for these individuals serves to further increase the burden.

Mass campaigns employing sulfa drugs and antibiotics have shown good results in controlling these diseases in Morocco, Taiwan, and Tunisia. Similar efforts have been initiated in Egypt, Indonesia, Spain, and Yugoslavia.



35048 O - 59 (Face p. 52)

DISTRIBUTION OF TRACHOMA
(Based on Incomplete Data)

Sources : World Population and Production by Woytinsky & Woytinsky
WHO Publications
Public Health Service Records

35048 O - 59 (Face p. 52)

R. SMALLPOX

Before the discovery of vaccination in 1796, smallpox was a scourge that swept back and forth over every country of the globe, killing at least one-fourth of its victims and leaving its survivors scarred, pitted, and often blind. Today, it is one of the most easily preventable of all infectious diseases.

However, smallpox is still a serious menace to the life and health of vast segments of the world's population. A single case may result in an outbreak which quickly builds up to epidemic proportions. It is also a constant object of quarantine vigilance because of its ready transmission by international travelers.

Only rarely is smallpox now found in Europe, North America, and Australia. Its endemic area is receding year by year and in the last several years, no cases have been reported from Chile, Mexico, Peru, and Venezuela. But it has a high endemicity in that area of Asia which stretches from Iraq and Iran through India and southeast Asia (with the exception of Thailand) to Indonesia; and also in certain countries of South America. In 1957, for instance, there were 66,706 cases reported in India and 744 in Ecuador.

There are other large areas in Latin America, Africa, and Asia, including Korea and Japan, where smallpox, though of low endemicity, constitutes a very real continuing threat. For large areas in central Brazil, the U.S.S.R., and parts of Africa, no data are currently available.

EB 21/WP/21 Jan. 1958, Campaigns Against Smallpox

Publication No. 40, June 1958, Four Year Reports on ons in the Americas

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SMALLPOX ENDEMICITY, 1954-1957

Areas where smallpox is absent or only sporadic or imported cases occur

Areas of low or moderate endemicity

Areas of high endemicity

? Data not available

Source: WHO Bulletin EB 21/WP/21 Jan. 1958, Campaigns Against Smallpox
PASB Scientific Publication No. 40, June 1958, Four Year Reports on Health Conditions in the Americas

35048 O - 59 (Face p. 54)

S. TUBERCULOSIS

Tuberculosis is a disease of truly worldwide proportions occurring in both temperate and tropical countries and for centuries one of the chief causes of death in practically all areas of the globe. Since 1947, however, there has been a dramatic decline in tuberculosis mortality owing to the use of new types of chemotherapy first introduced in that year. The comparative data shown here are for the years 1950–54 and only for those countries where good statistics are available. The decline would be even greater if calculated from 1947.

Despite this progress, tuberculosis remains one of the main targets in the international disease control. The mortality rates in certain areas of many countries are still extremely high. Furthermore, the decline in mortality, as such, does not indicate that the *prevalence* of the disease has decreased in the same measure. In some countries where morbidity statistics are available the number of known infectious cases has actually increased, even though the mortality rate has been lowered. The growing urbanization of population in many countries serves to accentuate the danger of the disease.

Reliable data in most of the underdeveloped countries are not obtainable, and it is in these countries that the incidence of tuberculosis is probably the heaviest. Recent surveys incident to BCG immunization programs show the prevalence of previous tuberculosis exposure for age group 15 of 77 percent in Bombay, India; 72 percent in Tangier; 66 percent in the urban communities of Taiwan; 59 percent in Yugoslavia; 52 percent in Egypt, and 49 percent in Ecuador. These ratios may be compared with a figure of 9 percent in one underprivileged section of New York City.

The management of tuberculosis is rapidly changing from a clinical to a public health approach through the use of immunizing agents and prophylactic and therapeutic drugs.

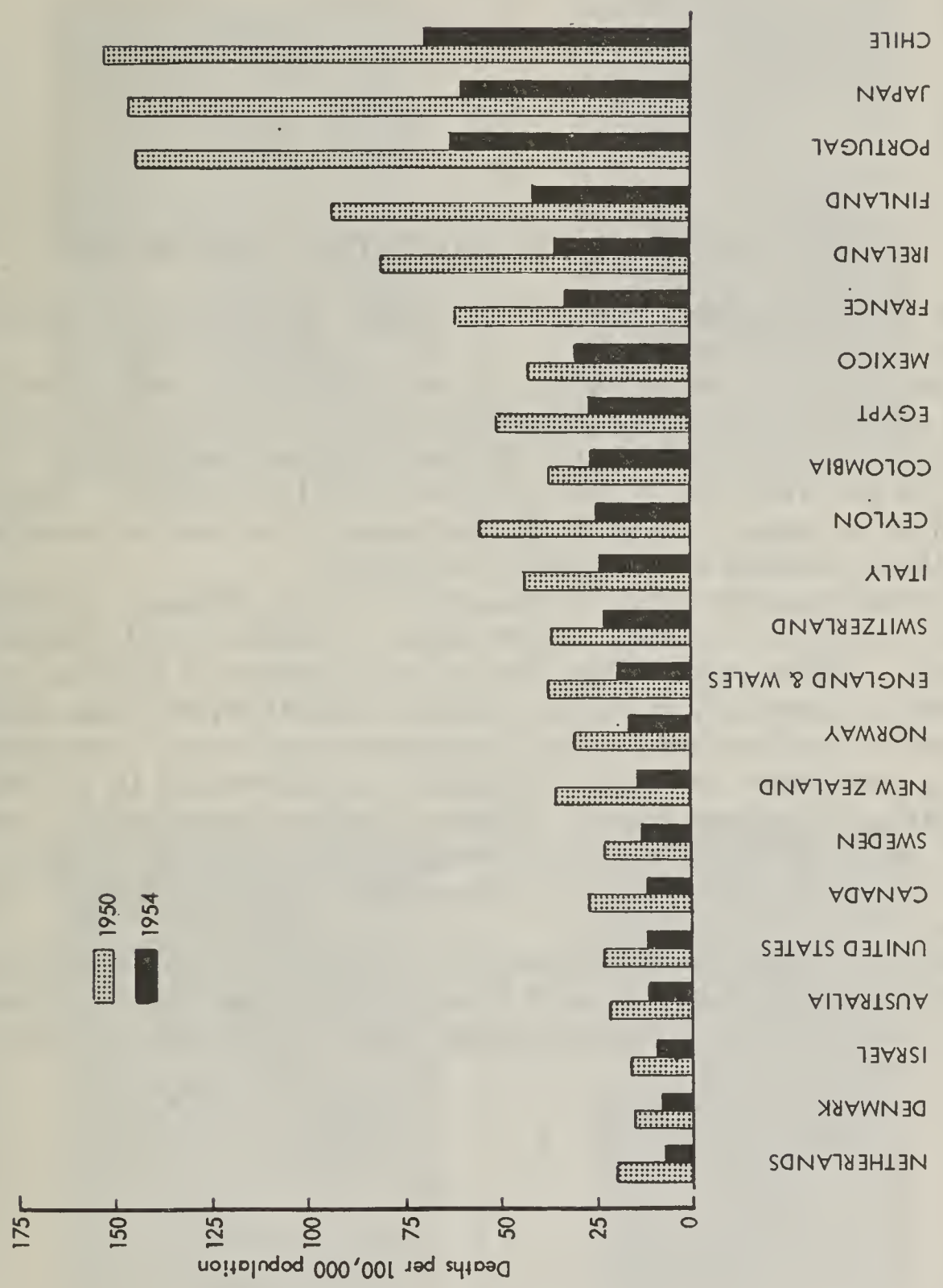
Mortality from tuberculosis, all forms

[Deaths per 100,000 population, 1950 and 1954]

Country	1950	1954	Country	1950	1954
Canada	26.2	10.3	England and Wales	36.4	17.8
United States	22.5	10.2	Ireland	80.2	34.3
Puerto Rico	129.1	38.2	Belgium	43.3	26.4
Mexico	41.0	27.9	Netherlands	19.0	7.5
Chile	152.9	69.8	France	58.1	32.4
Colombia	36.2	26.1	Italy	42.6	23.0
Egypt	48.9	26.2	Switzerland	35.1	22.1
Israel	14.8	9.3	Germany	----	----
Australia	20.5	10.0	Denmark	13.8	7.7
New Zealand	34.9	14.5	Finland	93.6	40.4
Japan	146.4	62.5	Norway	29.0	15.3
Ceylon	53.3	23.6	Sweden	22.1	13.0
Singapore	145.5	82.7			

Source: "WHO Epidemiological and Vital Statistics Reports," vol. 10, Nos. 2 and 4, 1957.

MORTALITY FROM TUBERCULOSIS, ALL FORMS, IN SELECTED COUNTRIES
1950 and 1954



Source: WHO Epidemiological and Vital Statistics Reports, Vol. 10, Nos. 2 and 4, 1957

T. THE CONTROL OF INFECTIOUS DISEASES

There are four chief methods by which the spread of infectious diseases can be controlled.

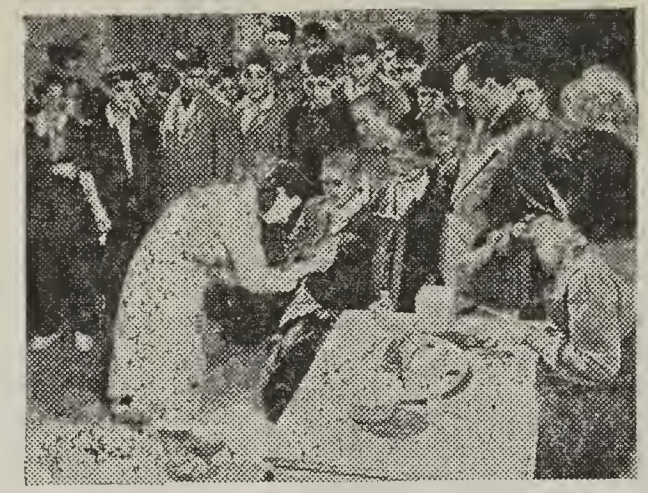
Immunization, or vaccination, is an essential in any attempt to control smallpox, typhus, whooping cough, poliomyelitis, typhoid fever, tuberculosis, influenza, cholera, plague, and yellow fever. Nearly all the vaccines in use today are highly effective. The main problem is to make sure that all the people who may be exposed to any of these diseases are properly vaccinated.

Prophylaxis and/or clinical treatment of the disease, is indicated for yaws, malaria, leprosy, tuberculosis, syphilis, bejel, pinta, and trachoma. Effectiveness depends on the number of clinical centers and medical personnel available and the utilization of these services.

Control or eradication of the disease-carrying insect, through mass spraying campaigns or other methods is fundamental in the attack on malaria, trypanosomiasis, plague, typhus, encephalitis, onchocerciasis, and filariasis. Though sometimes expensive to carry out, these control campaigns have, generally speaking, proved highly effective.

Control of human waste disposal is primarily a public health service sanitation operation, and is basic in any attempt to control schistosomiasis, hookworm, roundworm, cholera, amebiasis, and dysentery.

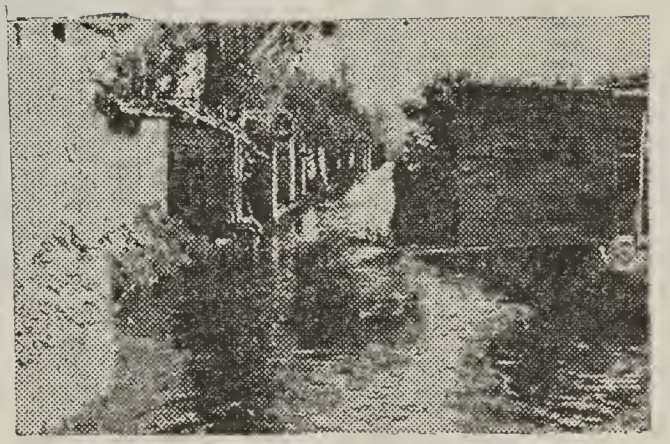
THE SPREAD OF INFECTIOUS DISEASES CAN BE CONTROLLED BY THESE ACTIONS



Immunization against Smallpox, Typhoid, Whooping Cough, Typhus, Polio, Tuberculosis, Influenza, Cholera, Plague, Yellow Fever

Control or Eradication of Insect Vectors of Malaria, Encephalitis, Trypanosomiasis, Plague, Onchocerciasis, Filariasis, Typhus

Prophylaxis or Treatment for yaws, Malaria, Tuberculosis, Syphilis, Bejel, Pinta, Trachoma, Leprosy



Control of Human Waste Disposal, Preventing Schistosomiasis, Hookworm, Roundworm, Cholera, Amebiasis, Dysentery

U. HEART DISEASE

Degenerative heart disease is now the most frequent cause of death in North America, in most of Europe, and among the more prosperous segments of the population in many other parts of the world. It affects chiefly middle-aged and older people, and its incidence and resulting mortality rates in particular countries are, therefore, affected to a considerable degree by the age distribution of the population.

Generally speaking, those countries having a high life expectancy rate, and consequently a larger proportion of older people in the population, will have a higher rate of cardiovascular mortality. However, there is evidence to suggest that the richer diet and more intensively paced life of the industrially advanced and higher income areas are in part responsible for the heavy prevalence of these diseases. The United States, for instance, with an average life expectancy of 70 years has one of the highest reported cardiovascular mortality rates—460 per 100,000 of population—whereas, Ceylon with the very respectable life expectancy rate of 60 has a rate roughly one-seventh as high (about 68).

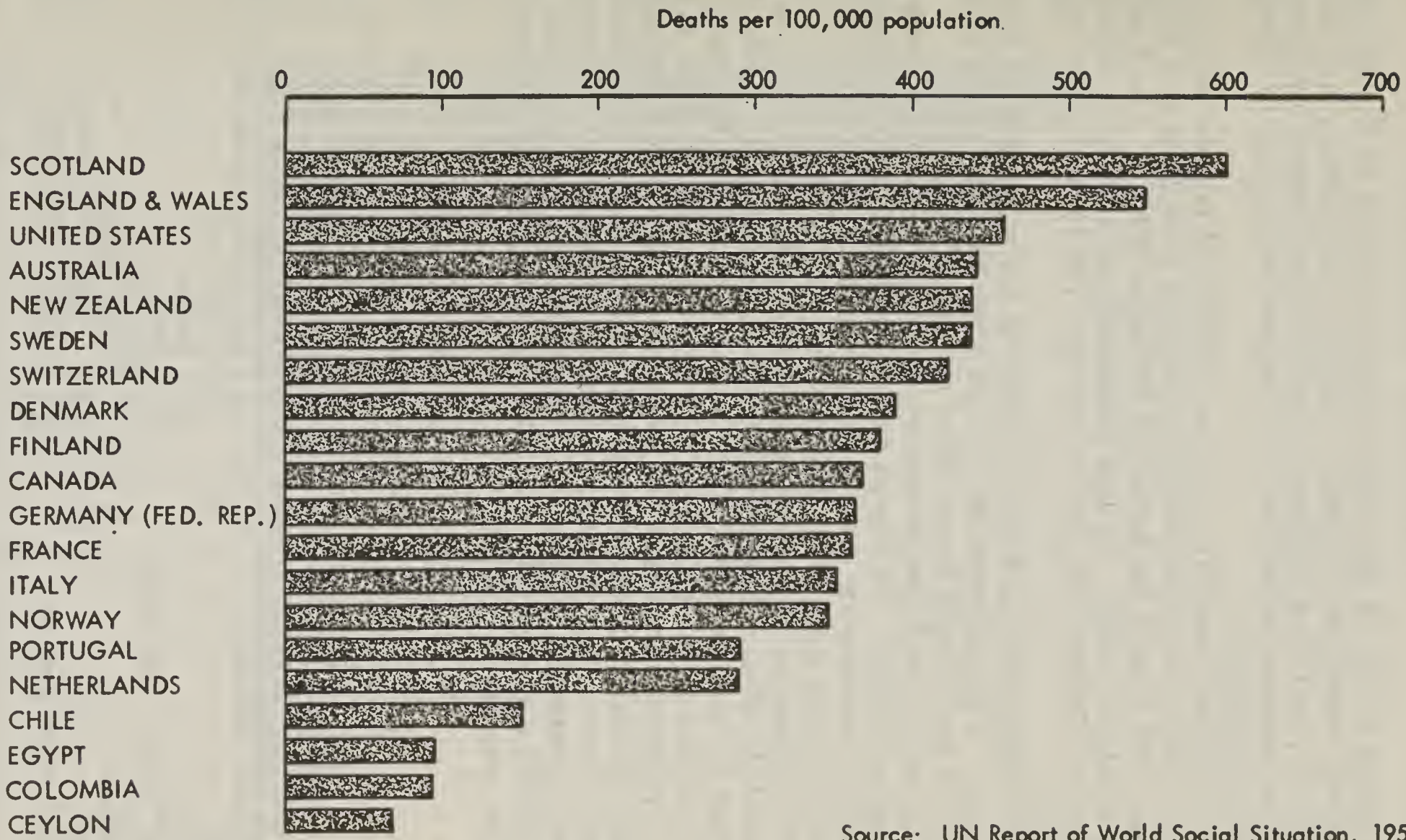
Mortality from cardio-vascular diseases

[Rates per 100,000 population]

Countries	1950	1954	Countries	1950	1954
Australia	437.2	441.9	Italy	----	354.2
Canada (excluding Yukon and Northwest Territories)	382.8	370.5	Japan	183.5	----
Ceylon	77.5	67.7	Netherlands	262.4	291.4
Chile	231.6	152.8	New Zealand (excluding Maoris)	459.7	439.2
Colombia	----	94.6	Norway	----	348.8
Denmark	----	392.1	Poland	224.0	----
Egypt (localities with health bureau)	94.0	95.7	Portugal	----	292.5
El Salvador	38.2	----	Sweden	----	438.6
Finland	317.9	382.3	Switzerland	----	425.7
France	363.3	363.0	United Kingdom:		
Germany (Federal Republic)	----	365.8	England and Wales	540.1	549.9
			Scotland	572.6	601.8
			United States of America	467.4	460.0

CARDIO-VASCULAR DISEASES

Mortality Rates in Selected Countries - 1954



Source: UN Report of World Social Situation, 1957

V. CANCER MORTALITY

Cancer is one of the major causes of death in the heavily industrialized countries of North America and Europe, and also Japan, Australia, and New Zealand. As with cardiovascular diseases, these are the countries which have the largest proportion of older people in their populations.

The highest mortality rate per 100,000 of population in industrialized countries is to be found in Scotland (206.2) and in England and Wales (205.5) and the lowest in Portugal (84.1). The United States has a rate of 145.8. In less industrialized countries where data are available Ceylon has the lowest rate (18.1) and Chile the highest (90.2).

Mortality from all forms of cancer is much greater for men than for women. The sharpest rise occurs after the age of 40, and the incidence is particularly heavy after the age of 60.

Cancer of the digestive system accounts for a little more than half of cancer deaths. In recent years, however, there has been a rather startling increase in deaths from cancer of the respiratory system, chiefly among men where the rise has ranged from 21 to 50 percent.

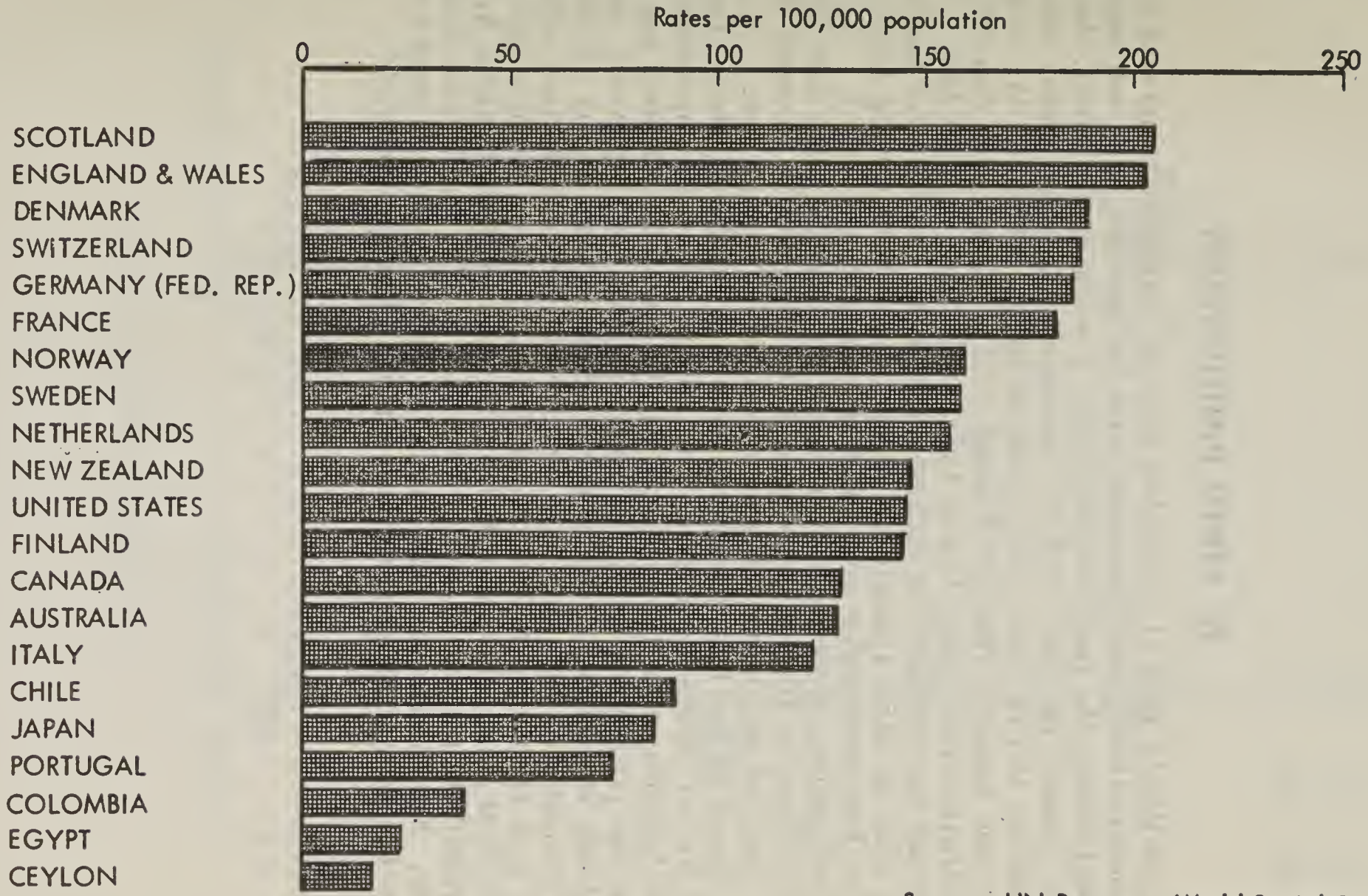
Overall cancer mortality rates have steadily increased over the past several decades. The chief exception has been in certain forms of cancer in women where improved diagnosis and treatment have to some extent arrested the rise. In general, the overall rise is accounted for by better diagnostic methods permitting the detection of more cases, the aging of the population, and the decrease in the number of deaths from other causes. There is evidence which suggests that heavy cigarette smoking and various types of air pollution in urban-industrial areas may be contributing factors to the increase in cancer of the respiratory system.

Mortality from malignant tumors

[Rates per 100,000 population]

Countries	1950	1954	Countries	1950	1954
Australia	127.4	129.2	Japan	77.4	85.3
Canada (excluding Yukon and Northwest Territories)	127.7	129.8	Netherlands	146.9	156.3
Ceylon	14.0	16.9	New Zealand (excluding Maoris)	147.7	146.6
Chile	83.6	90.2	Norway	----	159.7
Colombia	----	38.9	Poland	91.0	----
Denmark	----	190.0	Portugal	----	75.3
Egypt (localities with health bureau)	19.9	24.5	Spain	----	----
El Salvador	21.4	----	Sweden	----	158.9
Finland	138.4	145.3	Switzerland	----	188.2
France	173.1	181.9	United Kingdom:		
Germany (Federal Republic)	----	186.5	England and Wales	194.5	203.5
Italy	----	124.1	Scotland	193.8	205.0
			United States of America	139.3	145.8

MORTALITY FROM MALIGNANT TUMORS - SELECTED COUNTRIES, 1954



Source: UN Report on World Social Situation, 1957

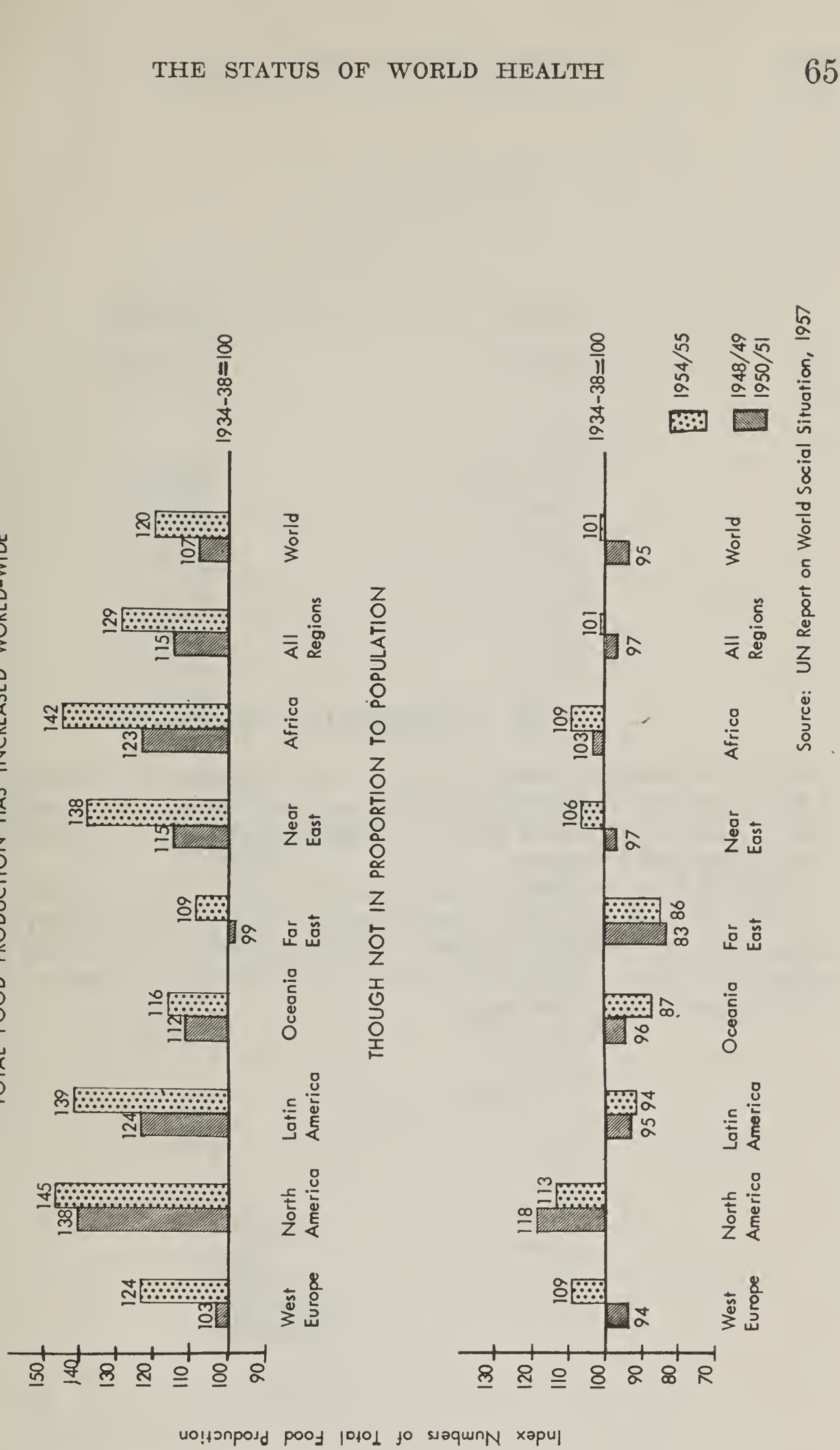
W. FOOD PRODUCTION

Since World War II, there has been an impressive increase in food production throughout the world, and the increase has been especially marked during the past several years. For the entire world, the index figure (based on the 1934–38 average=100) has risen from 107 in 1951 to 120 in 1955. The greatest gains between 1951 and 1955 have been made in Western Europe (103 to 124), Latin America (124 to 139), the Near East (115 to 138), and Africa (123 to 142). North American has reached the highest index figure of gain over the prewar level (138 to 145), though its proportionate gain during these years was far less spectacular than in other countries.

The smallest percentage increase from 1951 to 1955 has been in the Far East (a 10-point rise from 99 to 109) and in Oceania (112 to 116), both of which are below the worldwide average rise.

In some of the less developed countries, however, these increases have by no means kept pace with the increases in population. In Latin America, as of 1955, the per capita production of food has fallen below the prewar level by 6 percent; Oceania by 13 percent; and the Far East, with almost half of the world's population, by 14 percent.

The most striking gains have occurred in Western Europe, which by 1955 had converted a 6-point per capita loss to a 9 point gain; and in the Near East, which moved from minus 3 to plus 6. North America has raised its per capita index from 113 to 118, and Africa from 103 to 109. For the entire world, the index figure has moved from 5 points below the prewar level in 1951 to 1 point above in 1955.



Source: UN Report on World Social Situation, 1957

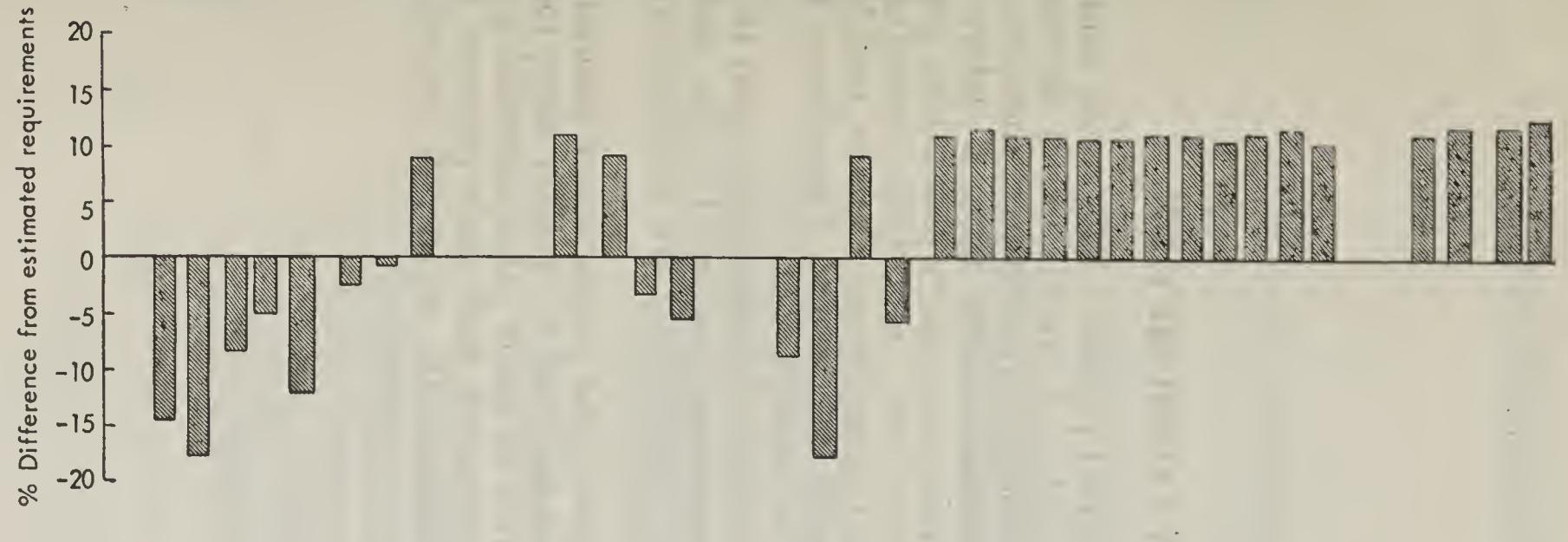
X. CALORIE INTAKE

In all of Europe, North America, and Oceania, the calorie intake is 10 to 12 percent above the estimated requirements for a satisfactory diet. Also, on the plus side are Turkey, the Union of South Africa, Argentina, and Uruguay.

Of the other countries, approximately half of the people manage to achieve their estimated requirements; the other half have calorie deficiencies of varying degrees. India and Peru have an 18 percent calorie deficiency, closely followed by Ceylon with 14 percent and the Philippines with 12 percent.

CALORIE INTAKE

In Many Countries Calorie Intake is Below Estimated Requirements



FAR EAST	Ceylon
	India
	Japan
	Pakistan
	Philippines
NEAR EAST	Cyprus
	Egypt
	Turkey
AFRICA	Fr. N. Africa
	Mauritius
	Tanganyika
	Un. S. Africa
MIDDLE & SOUTH AMERICA	Argentina
	Brazil
	Chile
	Colombia
	Cuba
	Mexico
	Peru
	Uruguay
	Venezuela
EUROPE	Belgium
	Denmark
	Finland
	France
	Greece
	Italy
	Netherlands
	Norway
	Sweden
	Switzerland
	United Kingdom
	Yugoslavia
	USSR
NORTH AMERICA	Canada
	United States
OCEANIA	Australia
	New Zealand

Source: UN Report of World Social Situation, 1957

Y. PROTEIN CONSUMPTION

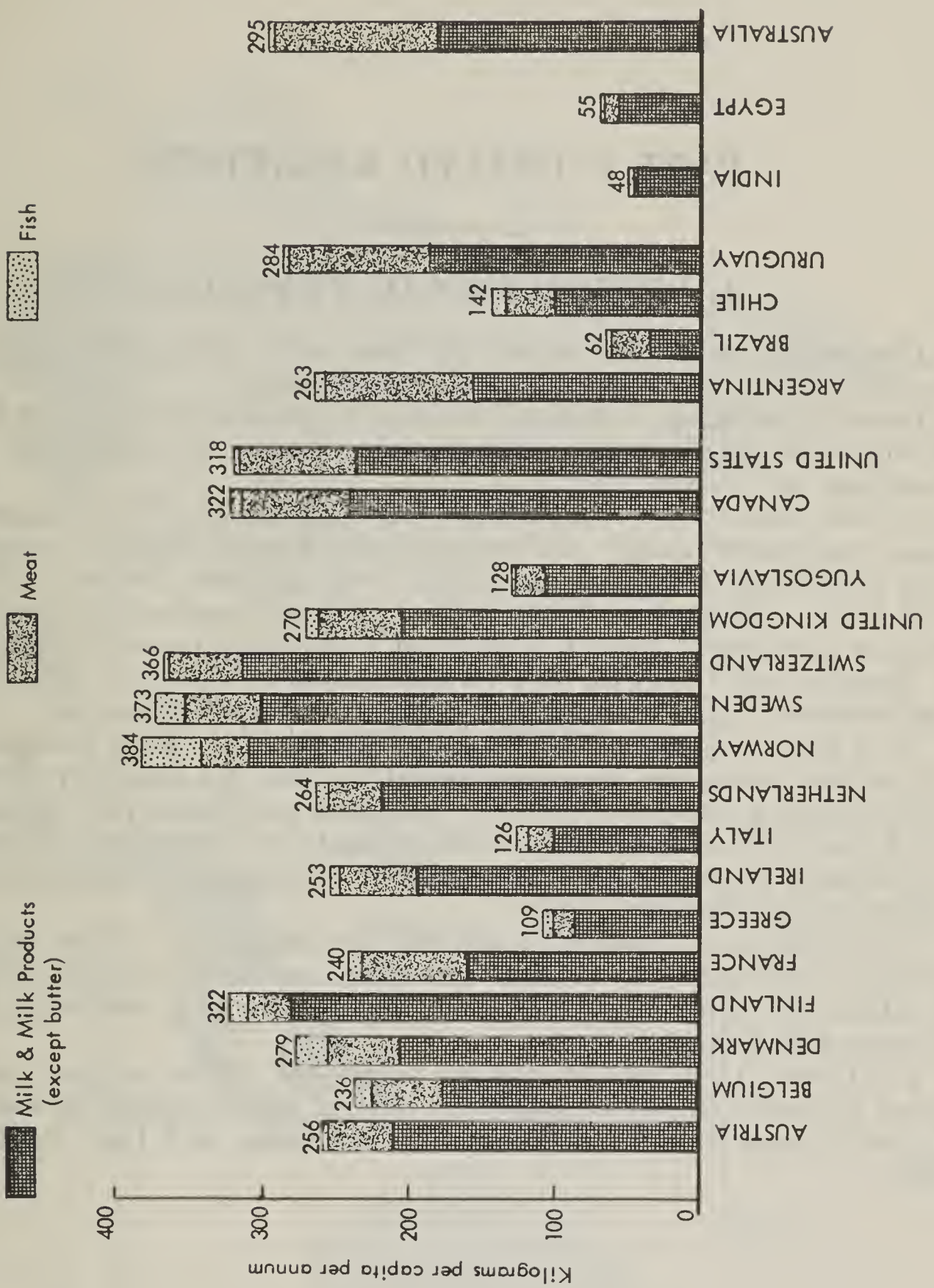
Per capita consumption of animal protein—fish, meat, and milk—is a measure of quality of the diet in a given country as contrasted with calorie intake which is primarily a quantitative measure.

Broadly speaking, those countries which have a calorie intake greater than their estimated requirements have also a high per capita protein consumption. But there are important exceptions; for example, the calorie intake of the United States, Canada, and Australia differs little from that of Greece, Italy, and Yugoslavia, but the difference in protein consumption is very great.

India, which has the highest calorie deficiency, has also the lowest protein consumption. Other countries like Brazil, Chile, and Egypt which have important calorie deficiencies, are comparatively low in protein consumption.

Of the three proteins here covered, the proportion of animal protein in the diet is a fairly dependable index of its quality since foods rich in animal protein are good sources of many other essential nutrients. Also these foods are usually expensive, and their presence in large amounts in the diet reflects, in general, the wealth of the country.

ANIMAL PROTEIN CONSUMPTION IN SELECTED COUNTRIES - 1953/54



PART 4. HEALTH RESOURCES

A. DISTRIBUTION OF PHYSICIANS

Physicians, as defined here, are those with a recognized status as licensed or limited-license medical practitioners.

Broadly speaking, the distribution of physicians reflects the degree of industrial development and per capita income of a country. Four groupings are shown.

I. Less than 1,000 inhabitants per physician. This category is made up predominately of European and North American countries, plus Argentina, Uruguay, Australia, New Zealand, Japan, U.S.S.R., and Israel. Excluding Israel (which has a heavy concentration of refugee physicians) there is a range of 1 physician to every 610 people in Austria and U.S.S.R. to 1 in 960 people in France. The U.S.A. lies between with a ratio of 1 physician to every 790 people.

II. 1,000 to 5,000 inhabitants per physician. This category includes the remaining European countries and the majority of South and Central American countries. Africa is represented by Egypt and the Union of South Africa; the Near East by Turkey and Syria; the Pacific area by a few small countries or territories with close association with the Western powers.

III. 5,000 to 20,000 inhabitants per physician. This category includes the remaining Central American countries; various countries in Africa, the Near East, Far East, and Pacific area, including India, Burma, and Pakistan.

IV. Over 20,000 inhabitants per physician. This category is made up of underdeveloped countries in central Africa, Saudi Arabia, and Yemen in the Near East, Vietnam, Cambodia, and Laos in the Far East.

INHA

atistical Office of the United Nations, December 1958
blic Health Service Records
HO First Report on the World Health Situation 1958

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RATIO OF POPULATION TO PHYSICIANS

INHABITANTS PER PHYSICIAN

- Less than 1,000
- 1,000 to 5,000
- 5,000 to 20,000
- Over 20,000
- No data

Source: Statistical Office of the United Nations, December 1958
Public Health Service Records
WHO First Report on the World Health Situation 1958

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B. DISTRIBUTION OF MEDICAL PERSONNEL [1]

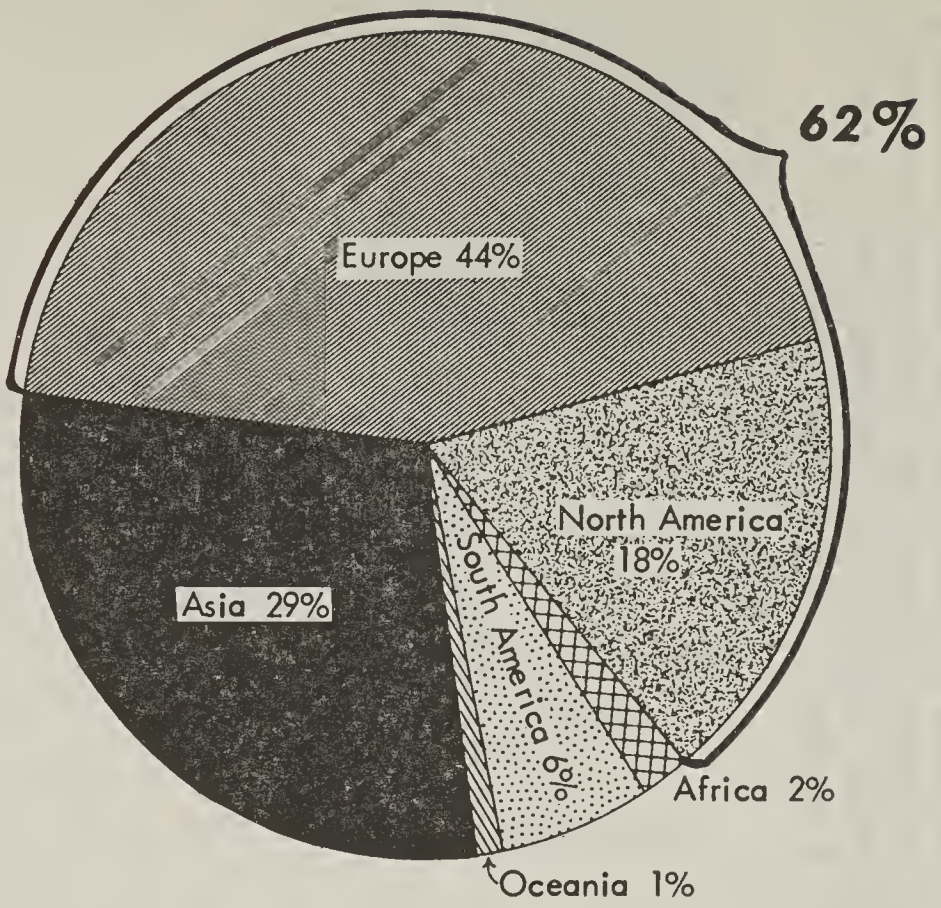
About one-third of the world population is served by about two-thirds of the medical personnel. As might be expected, the proportion of medical personnel is much higher in the economically developed countries of North America and Europe than in other less-developed areas, particularly Asia and Africa.

The number of physicians proportionate to population has limited significance in many areas, because of the difficulties of ascertaining the distribution and utilization of their services. Also, many countries are trying to solve the physician shortage by the training and utilization of auxiliary medical and health workers. In southeast Asia and Africa, especially, these auxiliary workers are widely used to carry on the functions of physicians. However, no one can question the gross insufficiency of physicians in the underdeveloped parts of the world, where, in some countries, the ratio is as low as 1 to every 50,000 of population.

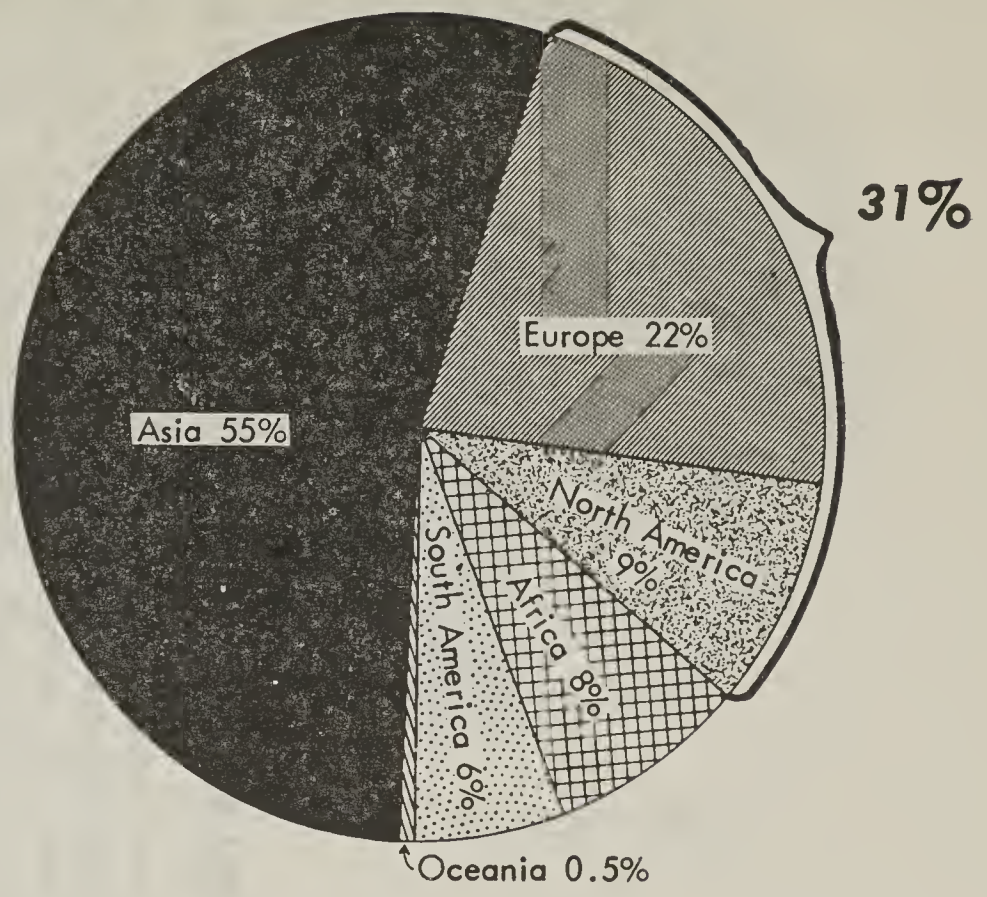
[1] Medical personnel, as used here, includes physicians, dentists, licensed midwives, and pharmacists. Nurses are dealt with elsewhere. Data were inadequate to include sanitary engineers, sanitarians, or other categories.

DISTRIBUTION OF MEDICAL* PERSONNEL

62% of the World's Medical Personnel Serves only 31% of the People



TOTAL MEDICAL PERSONNEL



TOTAL POPULATION

* Includes physicians, dentists, midwives and pharmacists

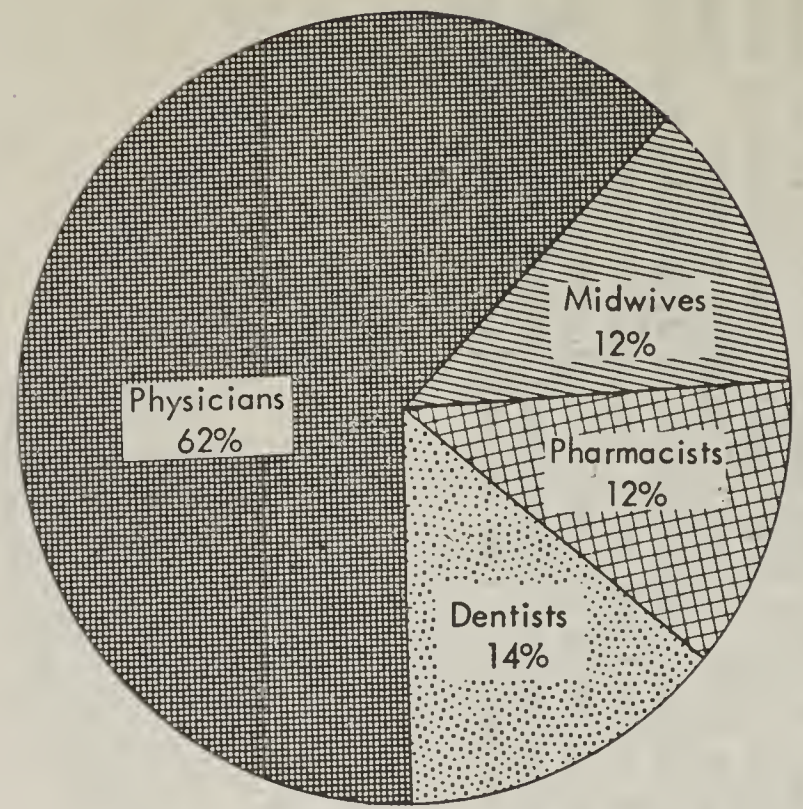
Source of data: Statistical office of the United Nations

C. CHARACTER OF MEDICAL PERSONNEL

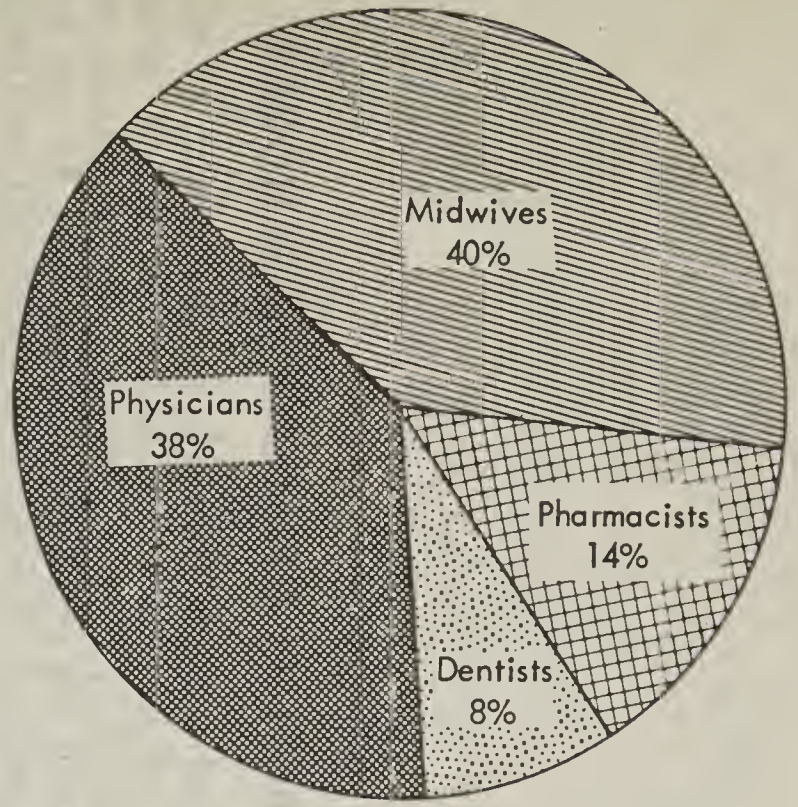
In the less developed countries of Asia, Africa, South America, and Oceania midwives constitute 40 percent of the available medical personnel; physicians, 38 percent; pharmacists, 14 percent; dentists, 8 percent. In the economically developed countries of Europe, North America, and in the U.S.S.R. physicians are the predominant with 62 percent, followed by 14 percent for dentists, 12 percent for pharmacists, and 12 percent for midwives.

Midwives, as included in this chart are those who have undergone specific training and are licensed by their governments. They are not to be classed with untrained individuals who practice midwifery without benefit of modern medical knowledge.

CHARACTER OF MEDICAL* PERSONNEL IN LESS DEVELOPED AREAS



** BETTER DEVELOPED AREAS



*** LESS DEVELOPED AREAS

* Includes only Physicians, Midwives, Pharmacists, and Dentists
** Europe and North America
*** Asia, Africa, South America and Oceania

Source: UN Statistical Office. 1958

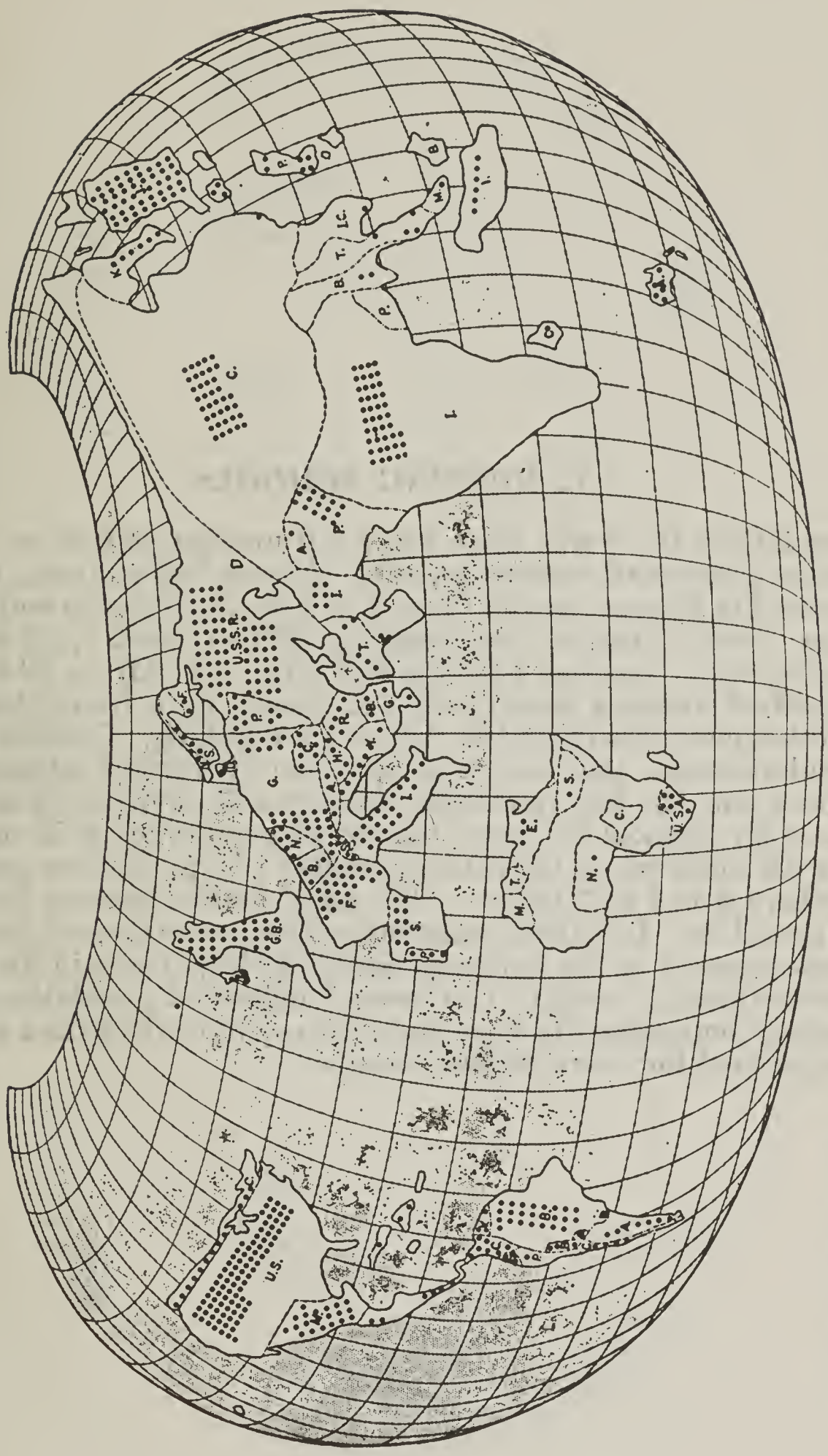
D. DISTRIBUTION OF MEDICAL SCHOOLS

There are 634 medical schools throughout the world, of which 356 (56 percent) are located in the industrially developed countries of Europe (including U.S.S.R.), North America, and Oceania, while 278 schools (44 percent) serve the remaining countries. In the developed countries, Europe (including U.S.S.R.) leads with 253 medical schools, North America is next with 97, and Oceania (Australia and New Zealand) have 6. In the less developed countries, east Asia has the largest number with 94, followed by South America with 53. Africa and southwest Asia have the smallest number, with 10 and 14, respectively.

Considering the ratio of population served to number of medical schools, the pattern changes somewhat. North America leads with 1 medical school for each 1.9 million people. Middle America, South America, Europe (including U.S.S.R), and Oceania are all comparable with 1 medical school for each 2.2 to 2.5 million persons. Asia, with a ratio of 1 to 8.3 million, and Africa with 1 to 22.4 million are far below the world average of 1 school for each 4.4 million people.

In 1955 an estimated total of 66,722 physicians were graduated from medical schools throughout the world, about two-thirds of them graduating from the schools in the industrially developed countries.

DISTRIBUTION OF MEDICAL SCHOOLS - 1957
(Countries distorted on a scale proportionate to population)



• 1 Medical School

PROJECTION OF ERWIN RAISZ

Source: WHO Directory of World Medical Schools
Summary of Four Year Reports on Health Conditions in the Americas, PASB. 1958

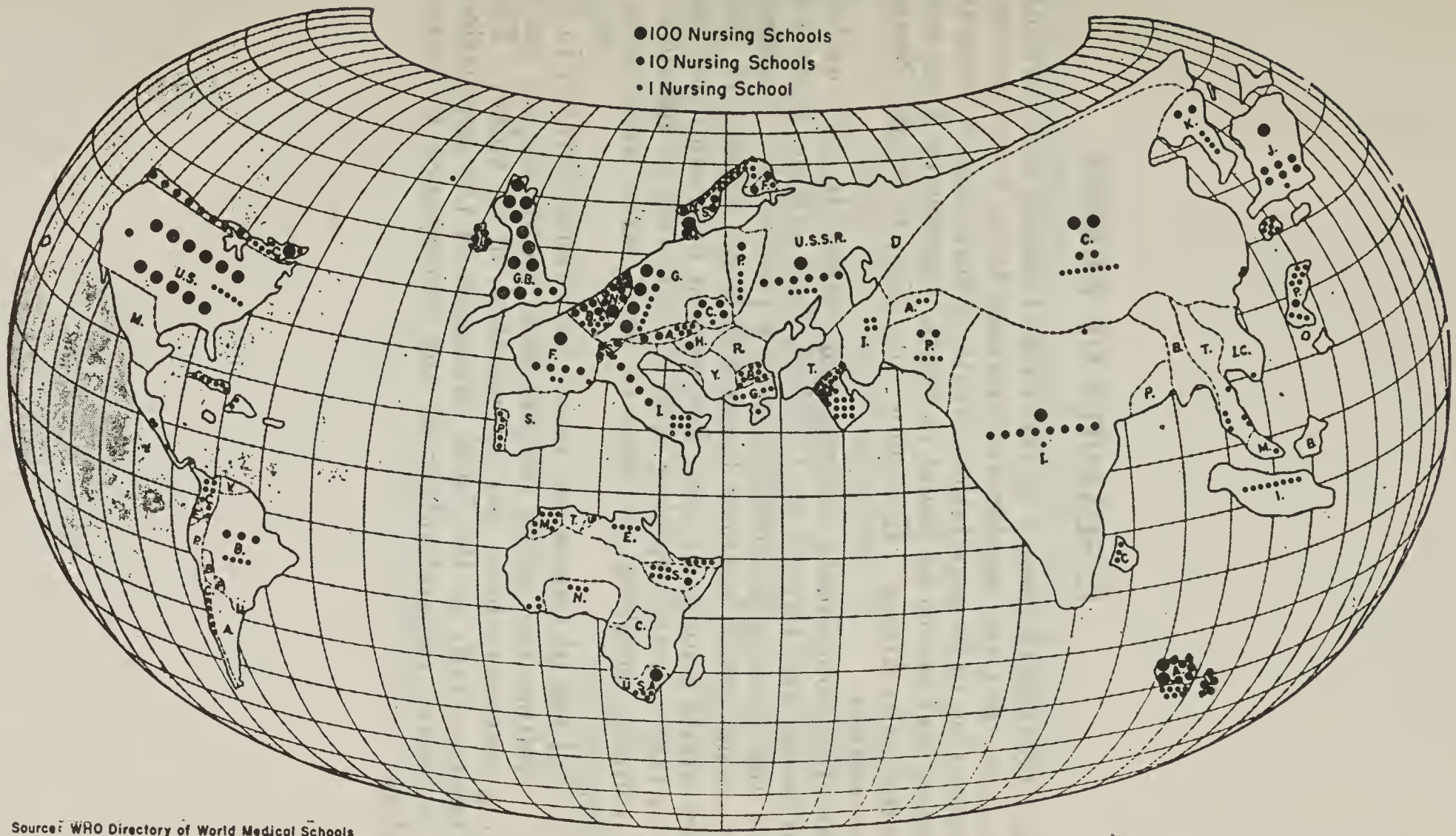
E. NURSING SCHOOLS

Throughout the world there are 4,910 nursing schools or nearly 8 times the number of medical schools. Almost half of them, or 2,230, are located in Europe, and of these, 1,619 are in Northern and Western Europe. North America has a total of 1,360, of which 1,115 are in the United States. Asia has 704; the U.S.S.R., 164; Africa, 144. South and Central America report only 58, though data from Mexico and some other countries of Middle America are lacking. Oceania has 308.

Populationwise, the uneven distribution of nursing schools among the more and the less developed countries is obvious. The United States, with 1 school for every 150,000 of population, is in sharp contrast with India where the ratio is roughly 1 to 2.2 million persons, or Iran where it is 1 to 5 million. For all of South America the ratio is 1 to 1.2 million. In Africa, where more than two-thirds of the schools are concentrated in the Union of South Africa, the ratio for the rest of the continent is roughly 1 to every 5 million of population.

Sparsely populated Oceania leads the entire world with a ratio of 1 nursing school for every 50,000 persons.

DISTRIBUTION OF NURSING SCHOOLS - 1957*
(Countries distorted on a scale proportionate to population)



Source: WHO Directory of World Medical Schools
Summary of Four Year Reports on Health Conditions in the Americas, PASB. 1958

* In areas without dots, no data available

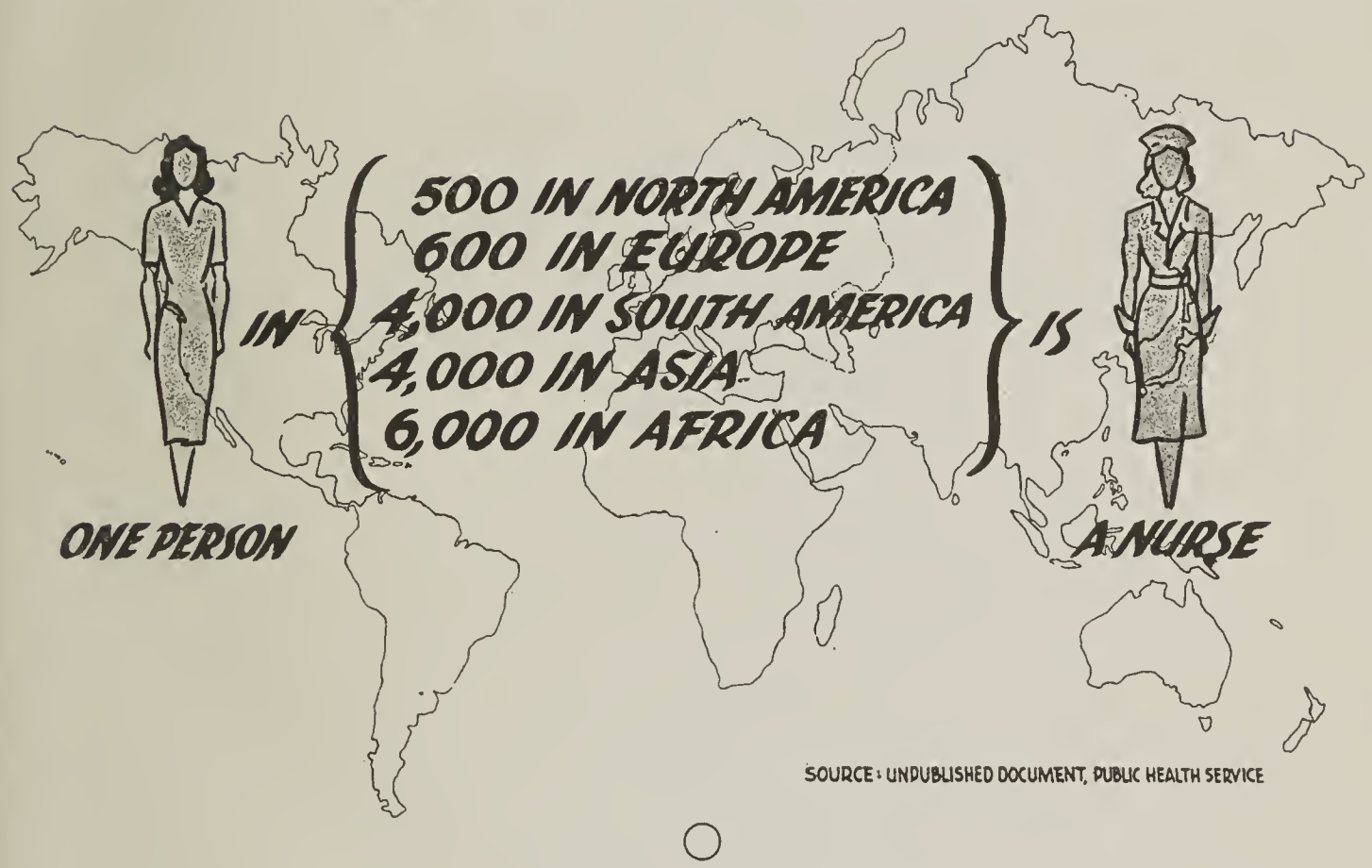
F. SCARCITY OF NURSES

The shortage of nurses in the United States is a perennial subject of concern, but the worldwide shortage is an even greater problem. In proportion to its population, North America has 8 times the number of nurses that are to be found in South America or Asia, and 12 times the number in Africa. Europe is only slightly behind North America in this respect.

The disproportionate shortage of nurses in the underdeveloped countries is due largely to the fact that women have a low social status and nursing is not considered a profession. Nursing is looked upon as low-grade manual labor which no woman of the educated classes would undertake, and few women have sufficient basic education to take nursing training even if they were so minded. The fact that nursing involves the care of both sexes constitutes a further barrier.

The full use of nurses has never been demonstrated in these countries. Neither the public nor the local physicians are accustomed to nursing service or have any appreciation of its value. The situation will improve only as the basic education of the population improves and a better understanding of the importance of nursing service develops.

A WORLDWIDE SHORTAGE OF NURSES



SOURCE: UNDUBLISHED DOCUMENT, PUBLIC HEALTH SERVICE

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